This magazine is published to promote sound thought upon and concerning industrial medicine and traumatic surgery. To that end it will contain articles, news items, reports, digests, and other presentations, together with editors' comments. The editorial policy is to encourage frank discussion. On this basis contributions are invited.

Industrial Medicine

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A Depigmentation of the Skin

—by Rubber Gloves—

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THE cases of depigmentation of the skin reported in this article resembled vitiligo. Vitiligo is defined by Ormsby as "an acquired cutaneous achromia characterized by variously sized and shaped single or multiple patches of milk white color, usually presenting hyperpigmented borders and a tendency to enlarge peripherally." In the cases presented here there were no hyperpigmented borders.

The name vitiligo was coined by Celsus years before Christ, and at that time the name referred to the white blotches observed in leprosy. Therefore, the primitive classification was "vitiligo benigna." We consider vitiligo today to be of a benign character. The numerous theories advanced for the etiology of vitiligo demonstrates that the cause is unknown.

The Arabian literature contains many references to this disease. Alibert in 1832 included vitiligo among the dermatoses, pointing out that there was no relationship between vitiligo and leprosy. Hardy in 1859 defined vitiligo as a pigmentary syphilis. Lebrun in 1886 thought vitiligo to be of nervous origin. Later, many investigators believed vitiligo to be due to injury of the nerve endings in the affected areas. Some have attempted to explain it on an endocrine basis. There are seven theories of the cause of vitiligo:

1. Nervous:
   (a) involvement of nerve roots.
   (b) sympathetic nervous system.
2. Endocrinological either alone or in combination with 1.
3. Infections (spirillosis).
4. Parasitic (fungus infection).
5. Allergic.
6. Chemical (irritants resulting from sweat decomposition, formic acid, chromic acid, gold sodium thiosulphate, etc).
7. Toxic (Gaucher, *Annales*, s. VI, iii, p. 1113).

Where vitiligo was found with other progressive diseases such as muscular atrophy, tabes dorsalis, meningomyelitis, facial palsy, the brachial plexus, paralytic states, syringomyelia, multiple sclerosis, etc., many authors associated the neurological findings with the vitiligo. It is easy to understand why a skin condition as common as vitiligo, was found to co-exist with diseases involving the neuroendocrine system such as hyperthyroidism,[1] Addison's disease, Recklinghausen's neurofibromatosis, symmetrical scleroderma, and alopecia areata. The vitiligo has also been associated with psoriasis and other dermatoses.[2]

Ruete[3] mentions that depigmentation may be congenital or acquired, of syphilitic origin,[4] or associated with a large number of skin diseases of which he specifically mentions the following: (1) psoriasis; (2) para psoriasis; (3) pityriasis rosea; (4) pityriasis versicolor; (5) neurodermatitis; (6) trichophyton infections; (7) lichen planus; (8) seborrhea; (9) chronic pruritis; (10 leukoderma solare; (11) eczema. The author does not mention any leukodermas arising from industrial irritants.

Iseki[5] reported 31 cases of depigmentation caused by a fungus which was brought into pure culture. The disease began with a desquamation of the skin, and later vitiligo made its appearance. The itching in the desquamation stage was intense. The fungus in question was about 2 mm. in width and somewhat bent. At one pole a round spore may be often found. Pure cultures are easily produced and inoculation into human beings produces the disease in all cases. Fox[6] investigated the high incidence of vitiligo in Yucatan, Mexico. The Wassermann reaction was taken in 25 patients and in 24 it was found negative. The commonest loca-

tion was the back of the hands. The author came to the conclusion that the vitiligo was caused by a fungus infection.

Naegeli[7] reported four cases of post-eczematous vitiligo. It is interesting to note that in all cases the basal metabolic rate was increased, this has been pointed out also by a long series of other investigators. He comes to the conclusion that chronic eczematous foci produce injury to the pigment apparatus in the skin usually caused primarily by a disturbance of the thyroid gland (as shown by the B.M.R.).

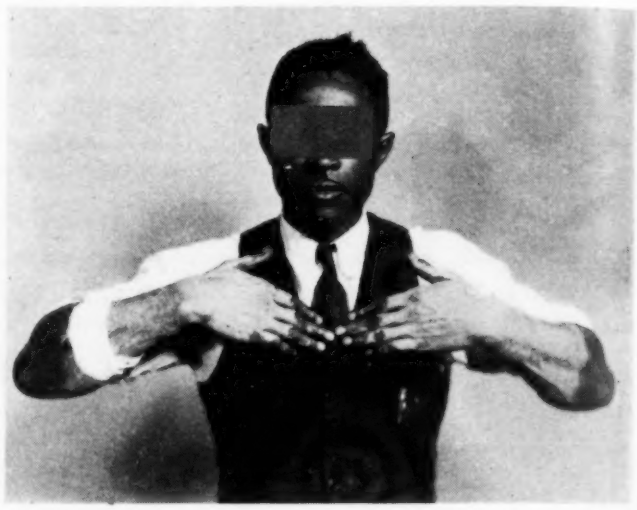
Costantino,[8] studied the pathology of vitiligo and came to the conclusion that not only biochemical factors should be taken into consideration but the study of the cutaneous circulation should positively not be excluded. He measured the temperature of the normal skin as compared with vitiliginous skin, and in only one case found a relative hyperthermia. He could produce dermographia easily on vitiliginous skin. Histamine produced quickly a skin reaction, characterized by a wheal and a diffuse surrounding erythema. No change was found concerning vascular permeability between vitiliginous and normal skin. Hemorrhage was found to be produced with much greater difficulty in vitiliginous skin as compared with normal skin.

Tosatti[9] concludes from experimental study with colloidal thorium, that there exist slight changes in density in albino rabbits as compared with dark rabbits. Savulesco, Constantinesco and Savulesco[10] believe that it is not a disturbance of the chromaffin glands, but that it is rather a manifestation of an allergic skin, therefore, desensitization of the skin proves of value provided that the allergen is detected readily and treatment instituted early.

Touraine and Brizard[11] investigated and studied 53 cases who came under their personal observation. In all these cases the vitiliginous lesions occurred bilaterally and symmetrically. Therefore, the authors in presenting their case reports do not emphasize the etiological factors as much as the neuromeric distribution. They believe that vitiligo is a neurodermatitis due to a posterior radiculitis. Vitiligo, in their opinion, is analogous to herpes zoster (shingles), which pathologically is known to be a posterior ganglionitis.

Tauber[12] reported a case in which the disease developed as the result of trauma. The spots became re-pigmented following exposure to sunlight, which demonstrates that the cells are still capable of producing pigment when stimulated. Golden[13] reports a case of a colored male 55 years of age, who 20 years before he came to the attention of the author, was bitten on the arm by a kitten, after which a small white patch developed. It began to spread very rapidly occupying more and more surface until practically the entire body was involved. When seen by the author, no pigmented areas were present and the body as well as the scalp hair was entirely white.

Pillsbury and Kulchar[14] reported two cases of vitiligo caused by the use of gold sodium thiosulphate given intravenously. A study of the microscopic sections showed the presence of severe inflammatory changes and the presence of small hemorrhages limited to the papillae and the subpapillary parts. They believed that the gold deposited in the depigmented areas probably failed to be reduced and to be eliminated producing a



cumulative effect, which finally led to a gold dermatitis.

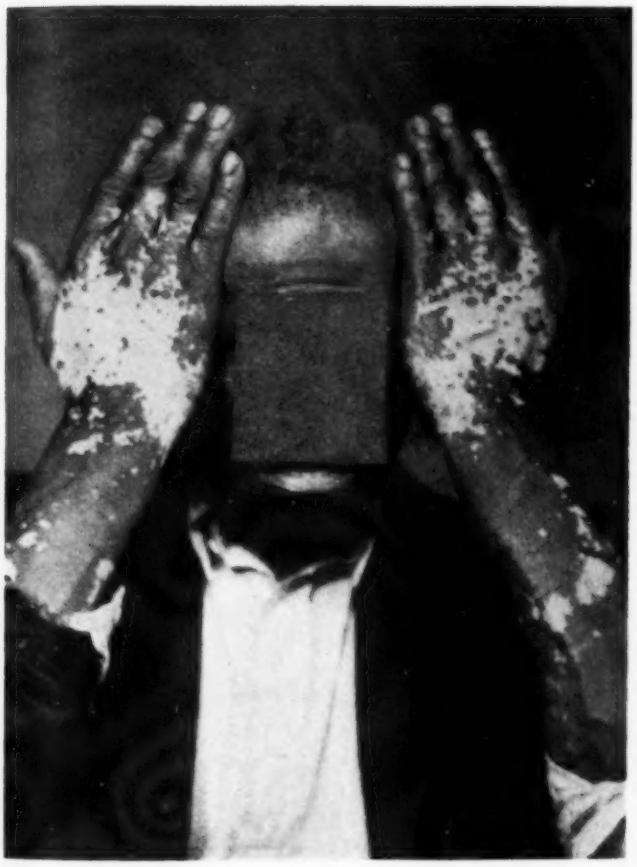
Jansion and Gervais[15] observed a case of vitiligo in a 30 year old girl who, when examined, presented signs of hyperthyroidism associated with a marked vasomotor instability. The patient was found to be Wassermann negative. The vitiliginous lesions were found chiefly on the neck, the upper extremities, and the hands, the trunk, below the breasts, below the umbilicus, and the

lower extremities especially the legs and feet. The desquamation of five years' duration, developed gradually and became worse in summer. The author believes that vitiligo is a disease caused by sunlight and may, therefore, be considered as one form of photodermatitis.

Trim and Sequeira[16] report a very peculiar spontaneous repigmentation of the skin in a negro, who stated that the vitiliginous areas had been present in the skin for 12 years. While in the hospital

where he was being treated for a compound fracture of the left tibia and where he remained for 16 weeks, his face became repigmented. The author states that during this period of confinement, the patient was never in the direct rays of the sun. It is of importance that the chest which was covered by the usual white hospital coat, showed little or no change. Nothing is known about the etiology of vitiligo, but the authors believe that the possible factors which may have affected this case were: (1) trauma, (2) rest in the hospital, (3) better food and (4) absence of direct sunlight for 16 weeks.

Roop[17] believes that vitiligo is the result of the absorption by the skin of certain decomposition



products of sweat. This decomposition may be ammonia, ammonium carbonate and carbonate. These products are believed to act as bleaching agents attacking primarily the melanin of the pigment cells. The author observed four cases in which the vitiligo was definitely related to sweating. In his cases the vitiligo was present where the sweating was excessive. He believes that in the presence of moisture the ammonium salts are dissolved, free ammonia is produced which, following absorption into the skin, attacks and bleaches out the melanin of the pigment cells. The author further presents a case of vitiligo in a five month old colored child, whose diaper was impregnated with decomposing urine, which smelled strongly of ammonia. On removal of the diaper a series of vitiligo patches were found in this area.

The urea content of sweat is about 1% and the evidence seems to indicate that it becomes quickly transformed into ammonium carbonate. In some cases urea is excreted so abundantly that when the sweat dries, the body is covered with a fine coating of urea crystals.

Blasi[18] believes that an oxidizing ferment is present in the skin which, chemically, is probably a tyrosinase. That in the absence of this oxidizing ferment, the skin remains depigmented. The author reports the case of a 16 year old farmer, who presented a large vitiliginous spot on the scalp located in the right frontal region, which gradually extended also into the parietal region. Finally almost the entire scalp was involved, the involved area being completely devoid of hair. There was no itching and no pain. Psychically and mentally he appeared normal for his age, otherwise the findings were essentially negative. The Wassermann reaction was negative. The author attributed the vitiligo to some deficiency in the sympathetic nervous system in a microsomic individual. Because there is a higher percentage of syphilis in the negro population, dermatologists have associated vitiligo with syphilis, but statistical evidence indicates that syphilis is incidental rather than causal.

Cederberg[19] is of the opinion that vitiligo and alopecia are due to an infection originally beginning in the mouth and that the virus gradually is absorbed in the organism (arising from a generalized spirillosis). The foci of infection being the mouth, the gastro-intestinal canal and even the vagina in which the spirillae are present in great masses even under normal conditions.

Werther[20] reports the case of a 39 year old lithographer, who originally suffered from a marked eczematous dermatitis of the hands and forearms caused by the prolonged exposure to chromic acid. The author states that vitiligo arising from an industrial irritant, is to be regarded as something rare. Jordan reported a case of vitiligo as sequel of a mercury dermatitis. The author believes that this type of vitiligo (produced by industrial irritants), is probably caused by a central lesion of the vegetative nervous system and is, therefore, a toxic manifestation.

In Werther's case the depigmented areas were found to be surrounded by small, red and indurated nodules. This eruption of lichenoid character is regarded by the author (Werther), as an hypersensitivity of the involved area and is probably due to a pathologically altered innervation (nervous hypersensitivity of central origin). The centers of vitiliginous spots, however, are considered by this author to be in a state of decreased sensitivity. Kreibich irritated vitiliginous skin by means of croton oil, and found that the depigmented areas were not affected, whereas, the adjacent areas presented a dermatitis. It was found in our cases that the depigmented areas were not affected by the application of strong acetic acid, while the adjacent areas of skin presented a dermatitis.

Pawlow[21] observed a case of a 22 year old male who developed a vitiliginous spot on the right eye-

brow following an injury. Later a pigmented nevus formed within the vitiliginous area. The author believes that the changes were the result of a traumatic neuritis involving the ramifications of the first branch of the trigeminal nerve (ophthalmic nerve and its branches).

IN THE July issue of INDUSTRIAL MEDICINE, a preliminary notice was inserted indicating that an article would be forthcoming on an occupational leukoderma in negro workers in tanneries, caused by the use of rubber gloves (gauntlets). (A review of the literature failed to show a similar condition.) These cases, 34 in all, came to my attention in April, 1939. Although these men were engaged in this type of work for many years, not any of them had had such previous occurrence until all were given new rubber gloves to wear, which covered the hands and arms nearly to the elbows, when they began to notice, after several months usage of these gloves, that areas of depigmentation appeared. It was found that the depigmented areas occurred not only on the hands and arms but also on other parts of the body wherever the gloves came in contact with the skin when the subjects were perspiring freely. An investigation showed that when the gloves fitted very tightly and no perspiration came in contact with the skin there was no depigmentation. The depigmentation occurred gradually over a period of several months with a mild inflammatory reaction, but no vesication or ulceration, and was caused by an antioxidant containing mono-benzyl-ether of hydroquinone containing unchanged hydroquinone. Some of the synthetic rubbers of the neoprene type contain also beta-naphthoquinone and hexamethylenetetramine. This latter substance decomposes into formaldehyde. Castellani and Chalmers[22] reported a depigmentation due to formaldehyde.

However, in one colored subject in whom I have applied mixtures of formaldehyde and formic acid over a period of four months I have been unable to produce a depigmentation although a severe dermatitis resulted. Hydroquinone, itself, causes a dermatitis. White[23] and Northcote[24] reported a dermatitis on the fingers from hydroquinone used for developing films. They do not mention any evidences of a leukoderma from this reagent.

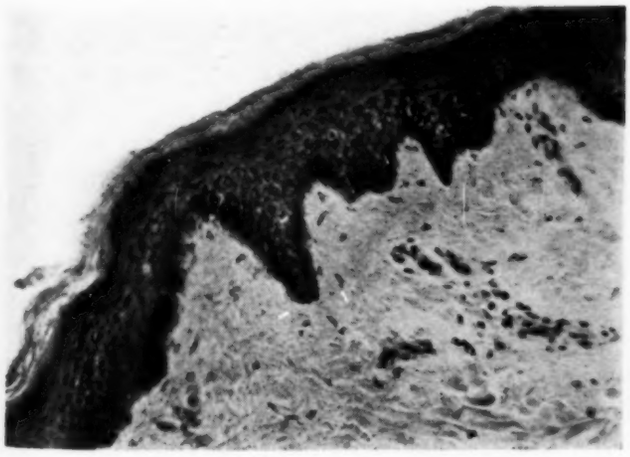
In the author's cases there was no illness during the development of the white patches. The depigmentation eventually became more pronounced and has remained white for nearly a year. In several of the patients areas of pigment are reappearing. It is of interest that the skin of the white

men engaged in this type of work and wearing the same type of gloves, did not show any great action until they were exposed to the rays of the sun when areas of leukoderma appeared. The occupational history of all the men was essentially the same in that they worked for 15 years or more in tanneries; that in June, 1938, all were given new rubber gloves to wear and that in September of the same year they began to notice a bleaching of the skin; that this bleaching increased and that in December of the same year they ceased wearing this type of gloves. The ages varied from 38 to 56 years. Wassermann tests were negative with the exception of one. Blood counts were normal with the exception of one. The temperatures and pulse rate of all the men examined were within the normal range. The blood pressure of nearly all was elevated ranging from 150 to 230 systolic, and 78 to 110 diastolic.

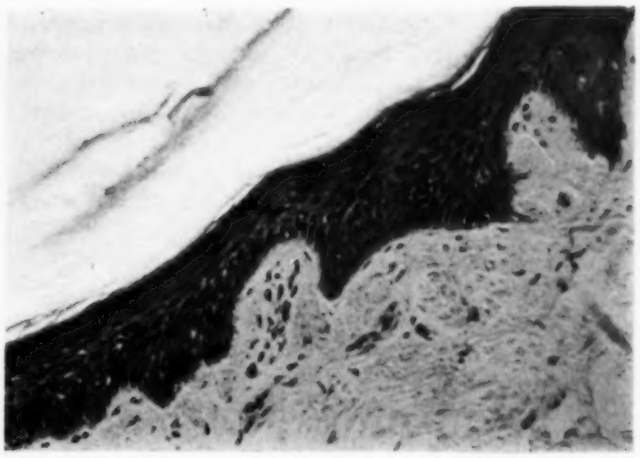
IN THE following is given a brief history of some of the cases.

Case 1: J. J., aged 51 years. Worked for five years in a tannery mixing lime with clear water, the lime contained calcium sulphide. In June, 1938, all the men were given new rubber gloves to wear. Six months later he noticed that white bleached patches began to appear on his hands. These bleached areas are about eight and one-half inches above the wrist on the left arm and about four and one-half inches above the wrist on the right arm. The backs of the hands are white and down the fingers and also the palms of both hands. Fingers are clubbed on both hands. There are white patches on his abdomen, half way to his knees. There are patches on the chest, six by four inches extending to the deltoid muscle. There are areas of scar tissue on the left arm but not so much bleaching. There is bleaching on the left side over to the right hip extending seven inches below the hip bone. Where overalls were worn there is a line of demarkation. Physical examination reveals a well developed colored male weighing 168½ pounds, height 5 ft. 8 in. Patient states he has frequent headaches. Eyes, no nystagmus; there is a marked conjunctivitis; eyes do not react to light and accommodation; arcus senilis present in both eyes. Teeth are in a bad condition. Throat is markedly injected. Tonsils are present. Chest is symmetrical. There are bleached areas with scarring over the chest. Heart is enlarged, arrhythmia present. Blood pressure is 230/140. Knee jerk is absent, Babinski, positive; Romberg, negative. Hemoglobin 16 grams. Wassermann is negative. Pathologic examination of sections of natural skin taken from J. J., shows that it contains the usual papillary processes and progressively flattened cells with thin cornification externally. The germinal layer of cells one to two cells deep is well provided with dark brown pigment. There is no noteworthy change of the subcutaneous tistue, nor hair follicles. Sections of achromic skin contain cells of normal arrangement but the cornified layer is three to four times as thick as that of the normal skin. The pigment is absent from the germinal layer with the exception of three to four cells at the very tip of an especially long papilla. The subcutaneous tissue and hair follicles are unaltered.

Case 2: H. I., aged 44 years. Worked 15 years for a tannery. In September, 1938, after patient had worn new rubber gloves for several months, he noticed that white patches began to appear on the anterior surfaces of his arms and hands down to the first knuckles of the fingers. There is a depigmentation of the skin upon the fingers and palmar surfaces of both hands. Thumbs began to bleach at the knuckles. On the left and right side of the body there are irregular white patches. Lack of pigmentation is present nearly to the top of the biceps muscle anteriorly and in midline. A line of demarkation is distinct on both arms to where the gloves covered the arms, about 7¼ inches above wrists on both arms. With the magnifying glass there are seen areas lighter in color with areas of atrophy of the skin. Physical examination reveals a fairly well developed colored male weighing 145¼ pounds. Eyes react sluggishly to light and accommodation; pupils are pin-point. Teeth are in poor condition. Blood pressure is 150/78. Temperature is 97, pulse 48. Reflexes are physiologically normal. Blood: Hemoglobin 16 grams (Newcomer); R. B. C. 4,350,000; W.B.C. 5,000. Wassermann is negative. Pathologic ex-



Case J. J. — Normal Skin (McNally)



Case J. J. — Depigmentation (McNally)

amination of sections of natural skin are as those described under J. J. In addition, there are well preserved sweat glands. Portions of the achromic skin still contain pigment at the tips of even blunt papillae and in isolated relatively flat zones of skin. From the distribution of the pigment it would appear that the skin would be blotchy in irregular areas. The cornification noted in the foregoing (J. J.) is far less extensive in these sections.

CASE 3: L. C., age 56 years. Worked in a tannery. Patient states that in September, 1938, he noticed a bleaching of his skin which became more pronounced in December, due to the use of new rubber gloves worn for several months. There is marked bleaching of both hands and arms about seven inches above the wrist down beyond the first knuckle. There is mottling on the right hand. There are areas of bleaching on the right deltoid muscle. There are white patches under the right axilla. The substance causing this bleaching seems to have acted as a depilatory removing the hair from both arms. Hair follicles on hands are brown, the tips are white. Physical examination reveals a well nourished well developed colored male. Weight 197 pounds. Eyes do not react to light and accommodation. Pterygium present in both eyes, arcus senilis present in both eyes. Teeth are in bad condition. Tonsils are present, throat is not injected. No enlargement of the thyroid. Chest is symmetrical. Lungs, no rales. There is shortness of breath. Heart, no murmurs. Respiration 22, temperature normal, pulse 78. Blood pressure is 190/110. No tenderness of the abdomen, no masses palpable. Reflexes: Knee jerk present; Babinski negative. Other reflexes physiologically normal. Blood: Hemoglobin 100% (Newcomer); R. B. C. 5,200,000; W. B. C. 6,100. Differential: No abnormalities. Wassermann, 25% plus. Physiologic examination of sections of natural skin exhibit normal pigmentation and cornification. The sections of achromic skin in about one-half of their extent contain a cornified layer as thick as the true living epithelium. Elsewhere the cornified layer is about half this thick. The tips of the papillae contain an occasional pigmented cell.

From the physical examination and histories of those who had this depigmentation, it is my opinion that the tyrosinase is reduced by hydroquinone which has strong reducing properties. Perspiration plus the chemicals contained in the rubber gloves were important factors in producing this leukoderma, as examination of the gloves did not show any evidence of a fungus growth.

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The Maintenance of an Industrial Medical Department

—*as Corporate Practice of Medicine*—

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THE question, which this article seeks to answer, is whether it is lawful for an industrial corporation to maintain a medical department for its employees. In order to determine the answer to this question, it will be necessary to consider the following three points:

First, whether an industrial corporation has the power under its corporate charter to provide medical and surgical care to its employees.

Second, the effect of the provisions of the several workmen's compensation acts, which require an "employer under the act"[1] to furnish the necessary medical and surgical treatment to its injured employees, as imposing a legal duty on such "employer" to designate and select the physician and surgeon.

Third, the interpretation of the several medical practice acts by the courts as to what constitutes the unlawful corporate practice of medicine.

Although each of these three points will be covered singly, the findings on each of these points, taken all together, will determine whether an industrial corporation maintaining a medical department for its employees is doing so lawfully.

The first point, then, is whether an industrial corporation has the power under its corporate

1. Practically all industrial corporations are "employers" under workmen's compensation acts.

charter to maintain a medical department for its employees. As corporate charters ordinarily fail to contain an express power for a corporation to maintain a medical department, the question arises as to whether an industrial corporation has the implied power to do so. Implied powers are defined as "incidental to the particular corporation, because they are necessary to enable it properly to exercise the powers which are expressly granted, and to accomplish the objects for which it is created."[2] In its classification of implied powers, Fletcher's Cyclopedia of Corporations states one of them to be "acts in part or wholly to protect and aid employees," which includes furnishing them with medical care, especially those employees who are injured in the course of their employment.[3] It is similarly stated in American Jurisprudence[4] that a "corporation employing labor has implied power to incur expenses for medical and surgical aid, and the like, for employees injured in the performance of their service. This rule has been applied to (such industrial corporations as) coal, manufacturing, lumber, sawmill,[5] mining and railroad companies." Among the leading cases which become specific in this relation is *Heinz v. National Bank of Commerce in St. Louis* (237 Fed. 942) wherein the United States Circuit Court of Appeals, in 1916, said as follows: "Even if it were possible, it would serve no useful purpose to enumerate specifically the implied powers of a private corporation whether engaged in the business of carrying on a railroad, a bank, or other business. In relation to the subject of employees only, numerous questions arise: What shall be the number of employees? What the amount of their salaries? Shall they be paid weekly or monthly? What shall be their hours of service? Shall they be paid for overtime work? Shall they be allowed vacation periods, and, if so, to what extent? Shall they receive pay during such periods of vacation? Shall they be paid during absence caused by sickness, and, if so, during what period of time? Where the employees are numerous at a given place, shall a lunch counter be provided and operated at cost, for the benefit of the employees? Shall hospital benefits be provided for sick or disabled employees? There can be no doubt that these are matters relating to the internal management of the corporation, and as such within its implied powers for determination." An industrial corporation, therefore, has the implied power to maintain a medical department for its employees, although no such express power is mentioned in its charter.

THUS it follows, as well established, that an industrial corporation, which employs a large number of persons, has also the implied power to purchase and maintain a hospital for them.[6] The case which best illustrates this rule is *People v. Hotchkiss*[7] in which the Metropolitan Life Insurance Company, the employer of a field force of 11,000 employees and an office force of 2,800 employees, was held to have the implied power to purchase a piece of real estate to build a hospital for the care and treatment of its employees who may be afflicted with tuberculosis. In the splendid reasoning for its decision in this case, the New York court declared that the "duties of the employer to the employee have been enlarged in recent years, and are not merely that of the purchaser of the employee's time and service for money. The enlightened spirit of the age, based upon the experience of the past has thrown upon the employer other duties, which involve a proper regard for the comfort, health, safety and well-being of the employee. A corporation may not only pay to its employee the actual wages agreed upon, but may extend to him the same human and rational treatment which individuals practice under like circumstances. It must do this in order to get competent and effective service. We see corporations pensioning old and infirm employees, establishing benefits for the sick and disabled, permitting regular vacations with continuing pay, aiding in sickness, and doing many humane and praiseworthy acts which formerly might have been questioned as not fairly within the powers or duties of the corporation. These acts are not to be defended upon the ground of gratuity or charity, but they enter into the relation of the employer and employee, become as it were a part of the inducement for the employee to enter the employment and to serve faithfully for the wage agreed upon, and become a part of the terms of employment. The considerate employer, who treats his employees well, is thus able to secure better service, and upon more satisfactory terms, than the unwilling, illiberal employer. A corpora-

2. Fletcher's Cyclopedia of Corporations, Vol. 2, p. 1766 (1917 Ed.).

3. Vol. 2, p. 1768 and 1798-9 (1917 Ed.).

4. Vol. 13, p. 839.

5. "The defendant was engaged in the operation of a sawmill. We judicially know, as it is a matter of common knowledge, that in such an enterprise much machinery is used, that the employment of laborers is essential to its operation, and that accidents are likely to occur. Without laborers the corporation would be powerless to carry out the purpose of its creation. It is therefore necessarily interested in the welfare of its employees. Much depends upon their health and their contentment in the service, and to conserve their physical comfort tends to their efficiency, and the greater their efficiency the greater the profit to the . . . . . company. It could hardly be denied that a private corporation engaged in the manufacture of lumber could, if it saw fit . . . surround them with such sanitary conditions as would tend to promote their general and physical welfare, even though its charter might contain no such provisions. . . . The employment of a physician to look after the health of the employees is but in line with the suggestions above made, and concerns one of those questions of internal management which we think may be fairly incidental to the objects of the corporation's existence." *Jackson Lumber Co. v. Trammell*, 199 Ala. 536, 74 So. 469 (1917).

6. In *Corning Glass Works v. Lucas*, 37 Fed. (2nd) 798 (1929), the defendant corporation, a large manufacturing concern, employs about 2,167 persons. It is located in a small town which has only 15,000 inhabitants. Corning Hospital is the only hospital in the town. The corporation averages about 600 accident cases yearly. As the dispensary facilities of the corporation were limited, the corporation found it cheaper to give this Hospital $25,000 to enlarge its building, than to go to the cost of enlarging its dispensary for its employees. This contribution was held to be reasonable and incidental to the carrying on of the business of the corporation.

7. 135 A. D. 150, 120 N. Y. S. 649 (1909).

tion with 13,800 employees is called upon to exercise great care in selecting and managing them, so as to receive the best service. Upon their loyalty and efficiency much of its success must depend. The employment, training, disciplining, and managing of such a force, and obtaining from it the best results, is an important part of the (corporation's) . . . business. It is well within the corporate power to assume as it has done, the care and treatment of such of its employees as are afflicted with tuberculosis; and, unless it is shown to be wasteful of the company's money and unproductive of beneficial results, the practice may stand as well within the scope of its business. The reasonable care of its employees, according to the enlightened sentiment of the age and community, is a duty resting upon it, and the proper discharge of that duty is merely transacting the business of the corporation."

It appears, therefore, to be well settled that under the law an industrial corporation has the implied power under its corporate charter to maintain a medical department and also a hospital for its employees, even though its charter contains no express power in this regard.

THE second point under consideration is the right of an industrial corporation as an "employer" under the workmen's compensation act to select and designate the physician and surgeon for its employees who are injured in the course of their employment. Incidentally, all these acts contain provisions which classify certain businesses and enterprises as "extra-hazardous occupations" and automatically place them under and subject them to the terms of the act. As the enterprises and businesses of practically all industrial corporations are usually of large magnitude, utilize considerable machinery and often chemicals, employ hundreds and even thousands of persons, their work generally comes within the statutory definition of an "extra-hazardous occupation;" and for this reason, nearly all, if not all, industrial corporations are automatically subject to the act. These acts, incidentally, are for most part very similar in that they require the "employer under the act" to provide financial benefits and medical care to its employees who are injured in the course of their employment. As to the right of an industrial corporation as an "employer" under these workmen's compensation acts to select and designate the physician and surgeon, who is to treat its injured employees, the acts of practically all of the States have been construed to give the employer[8] or his insurer,[9] the right in the first instance to select and designate the attending physician and surgeon.[10]

Why several workmen's compensation acts give the exclusive right to the employer to designate the medical attendant was enunciated in a leading case[11] as follows: "As a rule an employer is more competent to judge the efficiency of the doctor employed and to provide efficient medical and surgical treatment. . . . *It is to the interest of the employer to furnish the very best medical and surgical treatment,* so as to minimize the result of the injury and to secure as early a recovery as possible. The more serious the result of the injury, the more the employer must pay. Also by this means he obtains a complete knowledge of the exact condition of the injured employee. Thus, the burden for all reasonable medical aid and surgical treatment, medicine, etc., is cast on the employer, limited as to time, with the very wise and necessary safeguard against imposition that the choice of the medical and surgical attendant shall be left with him and that, if the injured person unnecessarily chooses his own physician, he will do so at the peril of having to bear the burden of the expense. That is a very valuable protection to the injured persons as well as to employers. The natural effect of a firm enforcement of it will be to expedite the return of honest claimants to the walks of industry and prevent them from having their misfortunes exploited for others' benefit. If the advantage to be gained by a firm administration of such provision would be greater on one side than on the other, it is on the side of the employees. Therefore, in case of personal injury to an employee in the line of his duty, the law should be construed and applied so as to secure to his employer reasonable opportunity to conserve the mutual interests of the two parties to the misfortune by supplying the medical and surgical needs of the injured." Thus it can be seen that generally under the several workmen's compensation acts, an industrial corporation as an "employer" under the act, has the right in the first instance to select and designate the physician and surgeon who is to treat its injured employees.

THE third point to be considered in this article is what interpretation the courts have given to the several medical practice acts when applied to corporations which have physicians and sur-

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8. "The intent of the . . . (act) . . . obviously is that the employer shall, in the first instance, have the right to designate and select the physicians who are to give treatment to the employee." *Leadbetter* v. *Ind. Acc. Com.*, 26 California A. 1268, 177 Pac. 449 (1918).

"The employer having been made liable for the (medical) services contemplated by the act, it seems from the language used that it must have been the legislative intent that he should be permitted to furnish a physician of his own choice." *Radill* v. *Morris & Co.*, 103 Neb. 84, 170 N. W. 363 (1919).

"It is apparent that, under . . . (the act) . . . , the employer is required to provide the necessary medical and surgical services therein specified. . . . When an employee is injured, the employer should be notified, as he has the right to select the attending physician." *Edwards* v. *Centralia Coal Co.*, 227 Illinois A. 453 (1922).

9. *Pecott* v. *American M. L. Ins. Co.*, 223 Mass. 546, 112 N. E. 217 (1916).

10. Corpus Juris, Vol. 71, p. 778; Ruling Case Law, Vol. 28, p. 822; Schneider's Workmen's Compensation Law, Vol. 2, p. 1622 (2nd Ed.).

11. *City of Milwaukee* v. *Miller*, 154 Wis. 652, 144 N. W. 188 (1913). A physician and surgeon, who is in the regular employment of an industrial corporation, and who provides the necessary medical and surgical treatment to its injured employees, himself is an "employee" under the workmen's compensation act. *Gomber* v. *Ind. Com.*, 261 N. W. (Wis.) 409 (1935).

geons in their employ. In order to obtain the viewpoint held by the courts as to whether the regular employment of doctors by a corporation constitutes a violation of the medical practice act, it is necessary to review all of the cases on this point. In each of these cases, particular stress will be placed on the precise elements present which determine the decisions of the courts.

PROBABLY the most outstanding case on this question is that of *People* v. *Medical Service, Inc.*,[12] decided in 1936. The facts were as follows: The United Medical Service, Inc., was incorporated as a corporation for profit to promote "individual and public health." It established a clinic in Chicago with fully equipped offices. The physicians connected with it were licensed by the State of Illinois. Through frequent and large newspaper advertisements, the corporation offered many medical services to the public at low prices. Patients seeking medical treatment paid the corporation for such treatment, which in turn paid the physicians and surgeons in its employ their renumeration. The corporation, itself, never applied for or had received a license to practice medicine. In holding that the corporation was guilty of practicing medicine in violation of the State medical practice act, the Supreme Court of Illinois declared that "the legislative intent manifest from the entire law (Medical Practice Act) is that only individuals may obtain a license thereunder. No corporation can meet the requirements of the statute essential to the issuance of a license. . . . It is clear that the respondent (corporation), owing to its corporate character, cannot obtain a license to engage in the practice of medicine. . . . The practice of a profession is subject to licensing and regulation and is not subject to commercialization or exploitation. To practice a profession (like medicine). . . . requires something more than the financial ability to hire competent persons to do the actual work. It can only be done by a qualified human being, and to qualify something more than mere knowledge or skill is essential. . . . No corporation can qualify. . . . The well established rule (is) that the State may deny to corporations the right to practice professions and insist upon the personal obligations of individual practitioners. . . . The police power of the state includes the power to enact comprehensive, detailed and rigid regulations for the practice of medicine. . . . There is no right to practice medicine which is not subordinate to the police power." In reviewing the facts in this case, it should be noted that the elements present, which determined the decision of the court, were that the corporation was conducted for profit, that it engaged in newspaper advertising, and that it sought patients from the general public.

In view of the presence of these three elements, the court was justified in holding that the United Medical Service, Inc., was engaged in the corporate practice of medicine in violation of the Medical Practice Act of the State. After a thorough consideration of the facts and reasoning of this case, the general rule may be restated to be that it is unlawful for a corporation to engage in the *commercial* practice of medicine, even if conducted through employees, who are licensed physicians and surgeons. This ruling represents the overwhelming weight of authority in the United States.[13]

The usual reasons advanced in support of this ruling are that the practice of medicine is a learned profession, that there is a confidential relationship between the physician and his patient, and that it is a matter of public policy for the State to insist upon and demand the individual responsibility of the physician and surgeon. A summation of all these reasons reveals that the real reason for this rule is to protect the professional practice of medicine from commercialization and exploitation, especially by laymen.

In an attempt to circumvent the majority viewpoint which holds corporate medical practice unlawful, various "insurance" corporations have been formed through which attempts have been made to engage in the practice of medicine by means of sales of "medical service insurance policies." The best illustration of this form of corporate medical practice is the case of *People* v. *Pacific Health Corporation, Inc.*[14] In that case the facts were these: The Pacific Health Corporation, Inc., was organized and operated as a stock corporation for profit. It offered a contract to the general public, which provided that, in consideration of a certain sum, it would furnish medical services by physicians, hospitals and medical laboratories to contract holders. To obtain the benefits of these services, contract holders must accept the services of a doctor upon the approved list of physicians and surgeons kept by the corporation. The corporation advertised its services to the general public, and paid commissions to its soliciting agents who sold these contracts. The doctors on the approved list were paid by the corporation. In holding that the activities of the corporation were unlawful and violative of the State medical practice act, the Supreme Court of

12. 362 Ill. 442, 200 N. E. 157.

13. *Godfrey* v. *Medical Society of New York County*, 177 A. D. 684, 164 N. Y. S. 846 (1917); *Pacific Employers Insurance Co.* v. *Carpenter*, 10 Cal. A. (2nd) 592, 52 Pac. (2nd) 992 (1935); *B. F. Life Assur. Co.* v. *Mitchell*, 14 Cal. A. (2nd) 654, 58 Pac. (2d) 984 (1936); *People* v. *Pacific Health Corporation, Inc.*, 12 Cal. (2nd) 156, 82 Pac. (2d) 429 (1938); Fletcher's Cyclopedia Corporations, Vol. 1, p. 340-1 (1931 ed.); Corpus Juris, Vol. 14A, p. 296-7; American Jurisprudence, Vol. 13, p. 838. In *People* v. *Woodbury Dermatological Institute*, 192 N. Y. 454, 85 N. E. 697 (1908), the defendant corporation was incorporated to carry on the business "of manufacturing chemical preparations and printing, publishing and selling books and pamphlets, relating to same and advertising same." The defendant corporation was convicted of a violation of a provision of the Medical Law which provides that "any person not a registered physician who shall advertise to practice medicine, shall be guilty of a misdemeanor." In affirming the conviction, the Court of Appeals of New York declared that "artificial persons (corporations) as well as natural persons fell within the prohibition of the statute," and that this statute makes it illegal for a corporation to practice medicine.

14. 12 Cal. (2nd) 156, 82 Pac. (2nd) 429 (1938).

California said that "the elements of solicitation of medical business and *lay* control of the profession are present wherever *the corporation seeks such business from the general public* and turns it over to a special group of doctors." The elements present in this case, and upon which the court based its ruling, are that the corporation was conducted for profit, that *the patients were solicited from the general public*, that the corporation engaged in general advertising and employed agents to obtain patients, and that the control and management of the corporation were in the hands of laymen. In accord with this ruling, similar medical service policies were held to be unlawful by the California courts in two cases. In one case,[15] the policy provided the insured with medical and hospital care for injury or disease, conditioned upon only when the insured was under "the exclusive care and supervision of the company's medical director and/or designated physician." In the other case,[16] the policy provided indemnity against loss arising from injury or disease. The insured was to be reimbursed under this policy when "wholly under the care of (physicians) approved and designated by the Policyholders Committee of the Company for the benefit of the insured."[17] In denouncing these policies as "the sale of medical services, which is the practice of medicine," the California courts stressed the fact that the policies allowed only the "insurance company" to select and designate its own special doctors to treat the insured, rather than allow the insured to be treated by a doctor of his own choice.

In contradistinction to the majority rule which holds that the corporate practice of medicine is unlawful, there is a minority viewpoint followed by the courts of Missouri[18] and Nebraska[19] which holds that the corporate practice of medicine does not violate the State medical practice if all the medical treatment is rendered by licensed physicians and surgeons who are employees of the corporation. In holding lawful a corporation similiar in organization and activity to the previously mentioned United Medical Service, Inc., in so far as the State medical practice act was concerned, the Supreme Court of Nebraska[20] set forth its reasoning for the minority viewpoint as follows: "There was no necessity of legislation to prohibit corporations, as such, from practicing medicine. It is impossible to conceive of an impersonal entity (corporation) judging the nature, character and symptoms of the disease or determining the proper remedy, or giving or prescribing the application of the remedy to the disease. Members of the corporation, or persons in its employ, might do these things, but the corporation itself is incapable to do them. The qualifications of a medical practitioner are personal to himself. The intention of the law (Medical Practice Act) is that one who undertakes to judge the nature of a disease, or to determine the proper remedy must have certain personal qualifications; and if he does these things without having complied with the law, he is subject to its penalties. Making contracts is not practicing medicine. Collecting the compensation therefor is not practicing within the meaning of this statute. No professional qualifications are requisite for doing these things."

Having given adequate consideration to the majority and minority viewpoint relative to the corporate practice of medicine, in so far as the several medical practice acts are concerned, the next points to consider are the exceptions to the majority ruling. The first exception that can be mentioned, and which is well known, includes those benevolent organizations, such as fraternal, labor, religious, and others of that type, which furnish medical services to their members. The reason why they are lawful is because "in nearly all of them, the medical service is rendered to *a limited and particular group* as a result of cooperative association through membership in the fraternal or other association, or *as a result of employment by some corporation which has an interest in the health of its employees.* The public is not solicited to purchase the medical services of a panel of doctors; and the doctors are not employed or used to make profits for stockholders. In almost every case the institution is organized as a non-profit corporation or association."[21] Another exception comprises hospitals,[22] sanitariums[23] and dispensaries, incorporation of which is specifically provided

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15. *Pacific Employers Ins. Co.* v. *Carpenter*, 10 Cal. A. (2nd) 592, 52 Pac. (2nd) 992 (1935).

16. *B. F. Life Assur. Co.* v. *Mitchell*, 14 Cal. A. (2nd) 654, 58 Pac. (2nd) 984 (1936).

17. In the Mitchell case, supra, the court declared that the "so-called policy holder's committee is not a committee of the policy holders but a committee of the company. The selection and designation of the doctors . . . is, therefore, after all but a selection and designation of the company. The creation of the committee is not a voluntary contribution of the members for the mutual benefit, but is a condition contained in the policy at the time of sale thereof. The company thereby undertakes to do indirectly what it cannot lawfully do directly. . . . It is significant that the policy does not provide that the insured shall be compensated for losses covered by the policy, but that the insured shall be reimbursed; in other words, the insured gets nothing until the doctor is paid."

18. *State* v. *Lewin*, 128 Mo. A. 149, 106 S. W. 581 (1907).

19. *State Electro-Medical Institute* v. *State*, 73 Neb. 40, 103 N. W. 1078 (1905).

20. Supra. An agent or officer of a corporation, who practices medicine without a license, can be convicted of unlawfully practicing medicine, although he purports to act for the corporation. *Norwood* v. *State*, 70 Texas Cr. R. 605, 158 S. W. 270 (1913).

21. *People* v. *Pacific Health Corporation, Inc.*, supra.

22. "A hospital duly incorporated under the membership corporations law unquestionably holds itself out as being able to diagnose, treat, operate and prescribe for human disease, pain, injury, deformity or physical condition. . . . An institution of this character possessing legislative authority to practice medicine by means of its staff of registered physcians and surgeons, comes under the direct sanction of the law in so doing." *People* v. *Woodbury Dermatological Institute*, supra.

23. In ordinary acceptation, a sanitarium is an institution for the medical treatment of sick persons, as well as for ministering to related needs of the patients. This treatment reasonably embraces, within its purview, the services of natural persons who practice medicine. The statutes expressly authorize corporations for the erection and maintenance of sanitariums. The authority in such a corporation to provide medical treatment to the patients, and to employ, for that purpose, those persons who are duly licensed to practice medicine is reasonably implied." *Republic Rec. Inc. Ass.* v. *Colgin Hospital*, 123 Texas 31, 65 S. W. (2nd) 286 (1933).

for by statute, and authority is conferred upon them to practice medicine by means of physicians and surgeons employed by them.[24] Still another exception involves corporations which "carry on the business of using the x-ray or electrotherapy or roentgenology. . . . The x-ray machine (is) . . . . a mechanical device which may be operated by anyone without a license from the State, provided it is under proper supervision."[25]

Another and probably the most important exception, as it indicates a medical innovation and the trend in these times, embraces the cooperative health membership associations of employees of a city, county, Federal agency, etc., to obtain medical care for its members. The following two cases illustrate this particular exception. In *Butterworth* v. *Boyd*,[26] the employees of the city of San Francisco established a system of health service by a charter amendment. By the Health Service System, the city employees were to pay $2.50 a month to a fund which provided medical treatment and hospitalization to the employees and their dependents. The employees were given the right to their own choice of any duly licensed physician subject to the rules and regulations of the Health Service Board in charge of administrating the Health Service System. In holding this medical service plan lawful and not a violation of the State medical practice act, the Supreme Court of California declared that "there can be no question . . . . of the power of the city to establish a system of medical service for its employees or their dependents. Proper medical attention, freely available to all such employees and such dependents, should have a direct and beneficial effect on their health, and therefore their efficiency . . . . The present plan, entirely self-supporting, and having a tendency to decrease sickness and lessen the expense of sick leave. . . . (is lawful)." It should be noted that under this medical service plan, the beneficiary had the right to choose his own physician, and that it was limited only to employees of a city. In *Group Health Assn.* v. *Moor*,[27] the Group Health Assn., a non-profit corporation, entered into a contract with the Home Owners' Loan Corporation by the terms of which the latter agreed to pay the former the sum of $40,000 to provide substantial and complete medical service to all of the employees of the Home Owner's Loan Corporation who cared to join it on a reasonable monthly basis. In holding that there was no violation of the medical practice act, a Federal judge stated: "I see no reason why an individual may not without violating the statute (medical practice act) contract with a physician for medical services for a stipulated period at fixed compensation; and it would seem that a group of individuals might make the same arrangement with a group of physicians. It would seem that this group of individuals might incorporate themselves for their own mutual benefit for the same purpose. Such a corporation, not for profit but for the mutual benefit of its members, is in my opinion not engaged in the practice of medicine or in holding itself out as doing so . . . . The actions of the (non-profit corporation) . . . . in no way tend to commercialize the practice of medicine. *Its membership is limited to the employees of the government in certain of the administrative branches. It is not in the business of making money by furnishing medical services to anyone who may come along.*"

SUMMARIZATION of all of the cases which involve the corporate practice of medicine from the standpoint of the several medical practice acts, and which have been considered in this article, reveals the general rule to be that the corporate practice of medicine through employed physicians and surgeons is unlawful, subject however to the exceptions such as hospitals, sanitariums, dispensaries, benevolent fraternal, religious and labor organizations, and cooperative mutual employee health associations. The main reasons why the courts have held these corporations excepted from the general rule, and, therefore, lawful, is because all or most of the following elements are present in their corporate entity:

1. Generally, non-profit corporation.
2. Members or patients benefit more than the officers of the corporation.
3. Usually, the patient or member has the right to choose his own physician and surgeon.
4. Generally, the control of the corporation is in the hands of physicians or representatives of the members or beneficiaries.
5. The general public is not solicited.
6. Does not engage in general advertising.
7. *Medical benefits are given only to a limited and particular group.*

The presence of one or more of the following elements in the organization and operation of a corporation, which employs physicians and surgeons, may make it engaged in the unlawful practice of medicine:

1. Incorporated for profit.
2. Conducted for the pecuniary benefit of the officers and stockholders of the corporation.
3. Generally, the corporation has the sole and exclusive right to select a physician for the patient or beneficiary.
4. Usually, the corporation is lay controlled.
5. Engages in general advertising and employs agents to solicit patients, or "beneficiaries."
6. *Patients or "beneficiaries" are solicited from the general public.*

Relative to the aforementioned detailed summaries it must be pointed out that the single element as to whether medical benefits are to a limited and particular group or whether the patients are solicited from the general public is often the main point upon which the courts base their decisions in determining whether a corporation is engaged in the practice of medicine.

Each one of the elements, mentioned in the preceding summaries, which determines the question

24. Fletcher Cyclopedia of Corporations, Vol. 1, p. 256 (1917 Ed.).
25. *Doumitt* v. *Diemer*, 144 Oregon 36, 23 Pac. (2d) 918 (1933).
26. 12 Cal. (2nd) 140, 82 Pac. (2d) 434 (1938).
27. 24 Fed. S. 445 (1938).

of the lawfulness of the corporate practice of medicine from the standpoint of the several medical practice acts, may be taken singly and discussed now as to their application to industrial corporations which maintains a medical departments for their employees.

Being business enterprises, all industrial corporations are incorporated and operated for profit. However, the medical department which such a corporation maintains for its employees is not maintained by it for the purpose of making money from its employees for the medical services rendered. Rather, it is an expense, and often a heavy one, which is borne entirely by the industrial corporation, and from which it derives no pecuniary benefit whatsoever, that is, in actual dollars and cents. The employees of the industrial corporation benefit more from the medical services rendered by its medical department than do the officers and stockholders of such corporation who receive actually nothing at all directly in this regard. As an "employer" under the workmen's compensation act, an industrial corporation has the sole and exclusive right to select and designate the physician and surgeon who is to treat its employees, and, therefore, by maintaining a medical department for its employees, it is merely carrying into effect a duty imposed by statute. The medical department of an industrial corporation also limits its medical services solely and exclusively to the employees of the corporation, and does not in any way attempt to extend its medical services to the general public. For these reasons, the maintenance of a medical department by an industrial corporation does not constitute the practice of medicine and, therefore, is not a violaton of the several State medical practice acts.

In conclusion, it may be stated that under the implied power of its corporate charter, and by virtue of the express provisions of the several workmen's compensation acts which require an "employer" to furnish medical services to its employees, and by reason of the interpretation by the courts of the several medical practice acts as to what constitutes the lawful and unlawful corporate practice of medicine, the law is clear and settled that an industrial corporation has the legal right to maintain a medical department for its employees, and that such maintenance, so long as the medical department is *for employees*, does not constitute the unlawful practice of medicine.

Abdominal Conditions

—As a Result of Trauma—

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THE subject chosen for this paper, has for a number of years been of great interest to me; however, a continuous search for literature on this subject, and a recent rather exhaustive review of current magazines, have failed to reveal any writings of importance along these lines.* For that reason, the contents of this paper will consist of general impressions, and the fitting in of conditions as a result of trauma to other well known and well recognized abdominal pathologies.

In the original creation of man, and during his long sojourn as an animal on four legs, the abdomen and its contents were well protected from injury by the lower ribs, the spine, the pelvis and the thick lumbar muscles. Most of the violence inflicted was expected to come from above and behind, and protection was provided against this. When man assumed the upright position, he immediately exposed his vulnerable unprotected underparts to all of the indignities which the modern machine age and mechanical contrivances have stored up for the unprotected and unsuspecting.

Trauma may be immediately, or with delayed action, responsible for any and all of the most serious abdominal complications, conditions as serious, almost, as any with which the surgeon has to deal. In traumatic cases, as in all other abdominal cases requiring diagnosis and differentiation, a complete and painstaking history is of the greatest importance. From the nature of these injuries, however, the history is often rendered vague and inaccurate. These injuries come suddenly and unexpectedly, causing shock and pain. The patient is thrown out of mental balance; he is uncertain as to his exact position at the time of receiving the blow. Frequently many of the important details are lacking. Also it may be that the case is one with no witnesses and the victim so seriously injured that practically no history is obtainable. All that is known is that an accident has occurred, and the rest of the diagnosis is dependent upon physical findings alone. Such lack of evidence should not be lightly accepted. After the administration of morphine bringing some alleviation of pain, careful questioning may often reveal important details having a definite bearing on approximating a diagnosis. Furthermore the relaxation obtained by the morphine may facilitate the examination, allowing deeper pressure and more detailed palpation of underlying structures.

NEXT to the history, one relies mainly upon the patient's general condition. Severe shock indicates extensive interference with the sympathetic system, making one suspicious of a ruptured intestine or severe contusion to the liver or kidneys. Symptoms of shock, in conjunction with a rapid weak pulse and other well known symptoms, are indicative of hemorrhage into the peritoneal cavity. Blood in the urine may indicate serious injury either to the kidneys or bladder. Penetrating wounds of the bladder as a result of fractured pelvis, should be borne in mind. This condition can be diagnosed definitely by catherization and x-ray examination following the injection of one of the opaque fluids into the bladder. Penetrating wounds of the spleen and liver accompany-

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ing fracture of the ribs are much more difficult of diagnosis and may only be discovered after abscess formation or at autopsy. Rupture of the bile duct, an infrequent but not unknown complication, can be diagnosed by an increasing jaundice, accompanied by the collection of fluid into the peritoneal cavity. Rupture of an intestine is best diagnosed by the marked abdominal rigidity, acute tenderness and pain and pronounced symptoms of shock.

The experienced surgeon can usually recognize these cases because of the unusual distress of the patient. In all such cases a careful x-ray examination, both fluoroscopic and the taking of flat plates, should be resorted to. The presence of gas in the upper abdomen, collecting under the diaphragm makes one immediately suspicious of a ruptured intestine. The x-ray may also aid in diagnosing the presence of blood in the peritoneal cavity, making an exploratory operation imperative. I am convinced that we do not make sufficient use of the x-ray as an aid to the diagnosis of many of our abdominal injuries.

It may be that we are confronted with conditions in which we have a reasonable amount of shock, pain, abdominal rigidity, no nausea or vomiting, no blood in the urine or bowel movements, no definite focal symptoms. Such cases we hesitate to explore, we treat them as we would a case of beginning peritonitis. The intestinal tract is put at rest, cleaned out from below and siphoned out from above; intravenous solutions are given in quantities. Morphine is given, low enemas are productive at first of some fecal material and the elimination of gas; there is little if any change in the patient's general condition. Then it may be that upon the third or fourth day we are faced with the increasing evidence of an intestinal obstruction as the result of trauma to the omentum or to the intestines. Enemas are no longer productive of gas, distention begins to increase, nausea or even vomiting may follow the temporary discontinuance of the Wangensteen drainage; paroxysmal attacks of pain are complained of and the pulse becomes more rapid. Unfortunately the laboratory is of little aid in such cases. The sedimentation rate and the leucocyte count remain normal and their increase can not be waited for as an aid in the diagnosis.

An operation after so long a wait is apt to be exceedingly hazardous. It may be that our scientific and zealous treatments have so far masked the symptoms that in the long run they have been a detriment rather than a benefit to the patient. I believe that the occurrence of fecal material in the siphonage from the stomach, is a definite indication of beginning obstruction. Any suspicion of obstruction should warrant an exploratory laparotomy. An early, unnecessary operation is much more to be commended than the late ineffectual attempt to remedy damage which has progressed to the point of the establishment of a spreading peritonitis. The handling of intestinal obstruction cases as the result of trauma constitutes one of the most difficult and discriminating procedures to which the surgeon is subjected, involving, as it does, the question of whether to thoroughly break up the adhesions, possibly opening into the bowel; the resection of a gangrenous loop of intestine; enterostomies; different types of intestinal anastomoses, the evacuation of intestinal contents and the drainage problems of existing peritonitis.

Following the immediate operation, one is at once confronted with a patient in desperate condition, suffering with a spreading peritonitis in whom a second operation will usually be necessary.

It will be noted that perforated wounds have not been touched upon, it being taken for granted that these wounds require immediate attention and that the operation will reveal the condition and dictate the necessary procedures for their relief, such as the suturing of bladder, intestine, kidney, liver or spleen. The operative procedures in these cases does not come under the objects of this paper.

IN RECENT years, the increasing tendency on the part of lawyers to hold trauma responsible for appendicitis, stomach ulcers, gall-bladder disease, kidney complications and all the ills which the female organs may be heir to, renders the diagnostician's problem increasingly difficult.

The Industrial Commission does not recognize traumatic appendicitis, however such a condition is possible though exceedingly improbable. It can only be diagnosed when the blow is directly over the appendix, where there is evidence of contusion to the appendix and cecum, along with the peritoneum and where the pathological report defferentiates between infection and recent trauma. The same common sense principles apply to the other conditions mentioned. However the question of retroversion and prolapse of the uterus is often a fruitful source of revenue to the lawyers and their female clients, because of the ignorant and exaggerated ideas the juries have of these organs and the inability or unwillingness of the surgeon to commit himself on such matters. Because of the protection afforded by the pelvic bones, the female organs are rarely directly traumatized. The indirect violence however is the one usually claimed with the consequent disturbance of menstrual and marital functions. The ruling out of the traumatic neurosis to my mind is the only serious difficulty, as I do not believe indirect violence plays any really important part in this condition.

In conclusion I should like again to stress the importance of making an early and if possible a definite diagnosis in all cases of abdominal trauma. I should also like to insist on the importance of the slight changes in the patient's daily or even hourly condition. The x-ray should be used freely wherever intestinal perforation or intestinal obstruction is suspected. Above all, the exploratory operation is too little used, resorted to too late, and dodged too frequently by family and surgeon. The surgeon who opens an abdomen and finds no injury is more to be respected than the one who frequently delays operation only to find conditions beyond any surgical control.

The Barbiturates

—*The Danger of Their Indiscriminate Use*—

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FROM time immemorial the nations of the world have had their sedative or emotion quieter.* The Chinese, for example, found relaxation and appeasement by inhaling opium from the pipe of peace. In other lands, alcohol in one form or another appeared to be the agent of choice. A humorous psychoneurotic when convalescing from an attack of delirium tremens aptly dramatized the situation when he penned something like the following:

"The Frenchman likes his native wine
The German sips his beer,
The Irishman drinks his half and half
Because it brings good cheer;
The Englishman wants his whiskey straight,
It relieves his nerves and dizziness,
But the American has no choice at all—
So he drinks the whole darn business."

This not only is an accurate and intelligent appraisal of our national attitude towards drinking, but also applies to many other shortcomings including the use of drugs.

At the turn of the century neurologists and psychiatrists (their number being few at that time) in their treatment of profound emotionalism, nervous instability and psychic unrest, which were then diagnosed hysteria, neurasthenia and psychasthenia, depended very largely upon bromides, chloral hydrate, hyoscine, trional, sumbul, valerian, lupulin, camphor, paraldehyde, certain coal tar derivatives and, in desperate cases, heroin, morphine and codeine. Most of these preparations were exceedingly hurtful to the gastro-intestinal tract and their prolonged usage fraught with grave complications. The opiates proved habit-forming and, at the instigation of organized medicine, their dispensation was rightly placed under the jurisdiction of Federal agencies. This indeed was a constructive move with which no one at present will honestly take issue. Hydrotherapy then came into the picture, and while it has become indispensable in the therapy of certain neuroses and psychoses in institutions, it cannot possibly reach the army of unstable individuals engaged in industry or otherwise employed who every now and then find themselves ill-adapted to combat conflicting emotions or withstand the strain that a highly complicated civilization exacts. To our dismay their number is legion.

Finally from the research laboratory emerged the barbiturates which not only made an instant appeal but also seemingly filled a long felt want. Pharmaceutical houses vied with each other in marketing their product in attractive containers, some utilizing alluring colored capsules. It is true they were first introduced to the profession, but it did not take long until they got out of hand because they were regarded safe and not habit forming. A busy practitioner when called on the phone at night by a patient known to be unduly fearful and insomnic, unhesitatingly directed him to secure, from his druggist, a certain barbiturate. What he should have done (had he known what he knows now) was to phone the prescription himself including a notation "not to be refilled." It is therefore little wonder that his patient from then on became his own physician in so far as nervousness is concerned, and the number of individuals who today are doing likewise is actually appalling.

BARBITAL (diethylbarbituric acid or diethylmalonyl urea) was presented under the name of veronal in 1903 by Emil Fischer and von Mering. The barbiturate preparations which followed are formed by substituting alkyl or aryl groups for the two terminal hydrogens which are very reactive, thus permitting the development of many substitution products. The substitution for instance of an ethyl group for each of the two hydrogens makes barbital; the replacement of one H by ethyl and the other by isoamyl gives amytal. The most popular members of the barbiturate family are barbital (veronal), phenobarbital (luminal), amytal, neonal, nembutal, dial, and ipral, the latter being the calcium salt of the ethyl isopropyl compound. The therapeutics and toxicology of the group are perhaps best represented by barbital, luminal and amytal and their sodium salts. Barbital is hypnotic and sedative, while phenobarbital (luminal) and amytal are less soporific but more analgesic, more depressing to the motor areas and more toxic. They differ in dosage and duration of action, but their effect is uniformly prompt and usually obtained within 30 minutes after oral administration and almost immediately following intravenous injection. Sedative doses are not particularly analgesic but when combined with pain relieving agencies their effectiveness is accentuated. Grabfield made an interesting comparison of various hypnotics and found that the relative efficiency of the barbiturates was: Barbital 94, phenobarbital (luminal) 69, ipral 71 and amytal 53.

Today the barbituric compounds are extensively called upon to allay psychomotor unrest, alleviate mental complications, suppress convulsive insults and for partial and even complete anesthesia, and when wisely prescribed they exercise an important role therapeutically. Nevertheless they are profoundly depressing to the central nervous system, but fortunately do not influence adversely respiration, metabolism, circulation or blood pressure. Nor does the discontinuance of their use in those long habituated provoke the manifestations of dependence, tolerance and craving that characterize the withdrawal of the opiates.

When a barbital product is administered to curb a temporary nervous uprising or some emotional crisis in a subject otherwise well endowed there is rarely any need for increase of dosage and little danger of habituation other than the desire for

* From the department of Neuropsychiatry, Charity Hospital, Cleveland, Ohio. Read at the Fiftieth Annual Meeting of the American Association of Railway Surgeons, Chicago, September 13, 1939.

easy sleep. On the other hand, while the drug is capable of inducing natural, dreamless rest from which the patient awakens apparently refreshed, he is not as alert as usual and a definite degree of inertia or lethargy prevails during the day. If persisted in, such medication insidiously lessens the individual's intellectual acuity and eventually stunts his efficiency.

In this connection it may be of interest to relate that within very recent years a considerable number of patients have been referred to neuropsychiatrists because they have been making mistaks, neglecting important obligations and no longer capable of sustained concentration. Most of them are under 50 years of age and engaged in positions of trust and responsibility such as office and plant supervisors, teachers, architects, engineers, train dispatchers, telegraph operators and the like. In my recent series two were found to be blighted by cerebrospinal lues, four in the throes of an oncoming arteriosclerosis and seven were supersensitive, preoccupied and introspective neurotics who had long been harassed by the fear of losing their job and worrying needlessly over financial and other vital matters. These functional cases had consulted physicians for various complaints the most common of which was visual fatigue and insomnia and when advised by competent oculists that their alleged distress did not rest on a structural basis, five of them found peace of mind by using barbiturates. Four had taken at least one tablet or capsule nightly for two and a half years or more. The subsequent rehabilitation of these subjects clearly demonstrated that their physical and mental retardation was due to the benumbing effect of hypnotics. This experience is recorded merely for the purpose of emphasizing the prevalence of secret, self-medication and the harm that such a practice exerts. It is also my impression that if reliable statistics were available they undoubtedly would show that a considerable percentage of those who desert their employment prematurely or are released because of impaired applicability are addicted to similar habits.

Luminal as a anti-convulsant, long ago proved its worth. It is not however curative, but it diminishes the frequency of the seizures and in some instances arrests them over a long period of time. Many mild epileptics are engaged in industry and transportation service—some in hazardous positions—and succeed in concealing their condition by self-medication. When a casualty befalls them they are very apt to deny the presence of their affliction. Railway and industrial surgeons should constantly be on guard to detect employees subject to convulsions, as they are invariably serious liabilities. They cannot ordinarily be recognized when the subject is free from attacks, but occasionally the loss of deep tendon reflexes plus old scars of tongue and mouth provides a valuable cue.

According to our professional oath we are not permitted to hold secret any measure or device that might prove helpful to the sick and yet I believe this requirement sometimes inflicts more harm than good. The old adage "A little knowledge is a dangerous thing" is as true today as in the past. In any event the Press is at liberty to cover our annual sessions and invariably give wide publicity to every medical discovery. All of this has tended to make the reading public "therapeutically minded," and it is therefore not surprising that there are now few well informed persons who are not familiar with the hypnotic qualities of one or more barbiturates and too many who utilize them indiscriminately and unjustifiably. In fact they have become the druggist's best seller, except in Canada and the few States that wisely permit their sale, only on prescription. It is also my belief that sooner or later the laity will be self-administering the recently developed and highly publicized sulfanilamide for every cough, every cold and every real or suspected infection. Diabetics will probably adapt a similar course when insulin tablets are placed on the market. Problems such as these constitute a serious challenge.

AS I heretofore intimated the barbiturates occupy a worthy place in medicine when prudently handled, but they are now used in such heavy doses that acute and chronic poisoning have become rampant. We now have our "barbiturate inebriates" exhibiting a symptomatology not unlike alcoholism, encephalitis, parkinsonism, multiple sclerosis, uremic coma and hysteria and the differentiation is sometimes impossible until the offending drug has been withdrawn.

Acute poisoning develops in susceptible individuals from over dosage or cumulation and is ushered in with mild frenzy followed by stupor if not coma, collapse with slow respiration and feeble heart action, cyanosis, dermatitis and profuse perspiration. Fatal cases succumb to respiratory paralysis or pulmonary edema. Those who successfully weather the storm require months for rehabilitation and very often psychic complications linger indefinitely. Chronic poisoning occurs largely in psychoneurotics who have long been slaves to self-medication and is usually expressed by lowered morale, morbid fears, feelings of inadequacy, lack of initiative and slothfulness. In the more pronounced types lethargy, unfaithfulness of memory, slurring of syllables, nystagmoid movements, diplopia and uncertainty of gait prevail. The barbiturates are also becoming extremely popular with those entertaining suicidal impulsions and every large hospital is receiving its share of toxic cases. The Los Angeles General Hospital encountered 61 cases in two years (19 using the drug with suicidal intent) and the Denver General Hospital encountered 100 cases during a period of three years. The average lethal dose for barbital is about 15 gms., phenobarbital (luminal) 8 gms. and amytal 2-3 gms. Webster indicts the barbiturates of being the seventh most common cause of deaths from poisoning. It is therefore plainly evident that any drug that so ravages the human organism should be administered with profound circumspection and never habitually or in excessive doses, except as a matter of last resort.

THERE are several other situations that arise from the irrational use of barbituric compounds, but I have time to discuss briefly only a few of them. First of all we would do well to appreciate that the nervous unrest which many people complain of in middle life is not infrequently the harbinger of an insidiously developing organic malady which might have been detected early had not the actual condition been masked by the effect of somnifacients. It would therefore seem to me that the physician who fails to regularly examine his so-called neurotic patients and control their treatment when possible, falls far short of his professional obligations.

Moreover, it has been my observation during the past five or six years that a surprising number of ambitious executives, ordinarily well poised and capable of accomplishing worthwhile things. are now seeking refuge in hypnotics during periods of intense apprehension and discouragement. The stress and strain of striving honestly to push forward and conserve their enterprises, in the face of official restraints, senseless obstacles, and pseudo-economic vagaries so deplete their resistive forces that they lose all feeling of security and become depressed and insomnic. Experience amply demonstrates that if a good-natured mule is prodded once too often he will backfire and that precisely is what transpires in the human brain when it is repeatedly subjected to innumerable nerve-racking assaults. Physicians are therefore charged with the responsibility of surrounding these worthwhile patients with such safeguards as will support them until they have learned to adapt themselves to life as it is given us and to control its vicissitudes with courage and forebearance. The habitual dependence upon barbiturates may be an easy and inexpensive method of relieving their agitation and despair, but in so doing they are actually deceiving themselves and inviting destructive complications.

It has repeatedly been claimed that the abuse of barbiturates is confined largely to psychopaths and constitutional inferiors, but this is not in harmony with the facts. It is true however, that a small percentage—the insurgent group, so to speak —do become addicted to excesses including self-medication, but most of them are content to abandon themselves to a life of indifference and have little urge for hypnotics because they do not fret and fume over the perplexities that prove so upsetting to their more normal, though supersensitive brother. I am quite willing to concede that the psychoneurotics constitute the worst offenders, but in these hectic and pathologic times how few are there amongst us who have not been torn asunder emotionally by discouragement, blasted hopes, crushed pride, terrifying fears and sleeplessness. Then again, every physician has and always will have within his clientele certain delicately organized subjects, otherwise intelligent, cultured and capable, who frequently find themselves in economic, social and domestic jams which at times drive them very near the line where sanity ends and a psychosis begins. In his management and control of these honest sufferers it will be expedient and necessary to temporarily depend upon a soporific whose therapeutic merits in such circumstances, need not be questioned, but he is duty bound to wisely supervise its administration in order to prevent drug addiction.

FINALLY and for the purpose of especially emphasizing the hazards that surround the promiscuous and careless prescribing of barbiturates to transportation employees permit me to relate a few personal observations:

1. A yard engineer, age 56, suddenly lost consciousness and before his fireman could act, the locomotive collided with a bumping post causing considerable property damage. The condition was regarded a cerebral accident until a half-filled bottle of sodium amytal was found in his pocket. He afterwards admitted having taken one or more capsules daily for several weeks at the suggestion of a dentist who had extracted an impacted molar.
2. A baggageman frequently reprimanded for heedlessness was suspected of being a periodic alcoholic until he was seen taking a number of luminal tablets while on duty. He claimed they were prescribed over the phone by his doctor for vertigo.
3. A street railway motorman was found in a "dopey" state after passing two regular stops and crashing a traffic light. Fortunately an ex-motorman sitting near by, sensed the situation and promptly stopped the car. The offender was afflicted with petit mal, and had been using luminal regularly over a period of several years.
4. An operator could not be reached during the night by a train dispatcher; in the morning he was discovered asleep and the office in disorder. Investigation disclosed he had been operated for mastoid sometime previously and the family physician recommended two barbiturates, one of which he had used more or less habitually for several months.
5. A train dispatcher was guilty on at least two occasions of making mistakes, the last one having almost precipitated a serious wreck. It was revealed that two months before, a hemorrhoid was removed under local anesthesia. The surgeon directed him to take a nembutal capsule three times daily until all pain abated. Patient told me that the drug gave him such a welcome sense of well being that he continued its use almost nightly.
6. An engineer was advised by his physician to take luminal to reduce his blood pressure. On his own initiative he increased the dosage. One night he was ordered to meet a train, whistled acknowledgment but seemingly forgot it until it was too late to avoid a collision.
7. A brakeman sustained what was regarded a mild head trauma in 1936, apparently made a substantial recovery and resumed his occupation. Not long thereafter he developed psychotic manifestations and was committed to a State institution. His wife subsequently let it be known that he became an addict when in the hospital for his injury and had since taken at least 10 tablets of luminal daily for nervousness.
8. A fireman with a meritorious record reported one morning for duty three hours after his train had departed. His face was scratched and there was a few inconsequential contusions on both knees. He informed his superior that he probably was held up by bandits, but had no recollection of being attacked and was not robbed. When he regained consciousness he found himself in an alley near the railroad tracks. It was ultimately ascertained that he had been taking large doses of a barbiturate at the recommendation of his doctor, to combat the worry and sleeplessness incident to constant wrangling in the home.

Pathological Fractures

—*in Relation to Industry*—

JOHN H. ALEXANDER, M.D.,
Pittsburgh, Pennsylvania

THE whole subject of pathological fractures has been largely neglected in medical literature and it opens a wide field for interesting study.* It has been considered a rare condition, yet is much more common than is suspected, as a search of the records of any large hospital reveals. In the more comprehensive articles upon this subject by Eliason in 1933, Welch in 1936 and Ghormley in 1937, the role of the trivial injury is brought out. I have been unable to discover any published paper as to the problem of the pathological fracture as it relates to industry and it is the coincidence of trauma to pathological fractures which I especially desire to emphasize in this paper. I have had no difficulty in collecting 28 cases both personal, and from the record of confreres occurring in the last three years and in 17 of these, the injury was believed conscientiously by the patient to have been the cause of his disability. These cases include pathological fractures occurring in osteomyelitis, bone cysts, giant cell tumors, multiple myelomata, Paget's disease, senile osteoporosis, hypernephroma and in metastases from carcinoma of the breast, lip and uterus. In several of these cases litigation is pending and in others it was prevented only by a prompt diagnosis and proof of the real cause of the fracture. These patients are very honest in their belief that the slight trauma caused the fracture. As an example, one patient having an advanced hypernephroma with metastases to the lung and the neck of the femur, causing a pathological fracture always insisted that riding a rough engine was the cause of his trouble.

While many of these fractures do occur following insignificant trauma, yet in practically all cases injury is purely incidental to the fracture. The bone structure has become so weakened by neoplasm or disease that fracture is imminent. It must be remembered that in osteogenic sarcoma and in Ewing's tumor, injury may be the original cause of the neoplasm and it has been stressed that in the former, trauma is considered the cause in 50% of the cases. In such a tumor, pathological fracture might justly be considered as traumatic if the history proved it to be so.

Many pathological fractures are purely accidental findings. There is a complaint of gradual or sudden and continuing pain and in searching for the cause, x-ray may show the unsuspected fracture. Even when the fracture is located, an x-ray of a number of bones may be necessary before the real pathology is determined. An x-ray of the chest if often of great benefit, as most malignant bone tumors show early metastases to the lung. Myeloma, however, rarely shows this metastasis. Other bones on the x-ray may show more typical pathology than that of the fractured site. There is no question but that many of these fractures are treated for months before the presence of a bone disease of some type is suspected. The diagnosis may require detailed study with special laboratory tests, blood and spinal fluid examinations, etc. In a personal case, the nature of the spontaneous fracture was suspected only after the finding of an extremely low red count and haemaglobin. The greatest number of known pathological fractures occur in the long bones, especially the femur. Metastases in malignant disease selects both flat and long bones, but many of those in the flat bones are not discovered except by accident. Long bones are more subject to strain and slight injury. All records seem to show that malignancy is the most frequent cause of pathological fractures. Union usually occurs in the benign tumors, occasionally in the malignant ones, but in over eighty-five percent of fractures as the result of malignancy, there is no evidence of any attempt at union. A fracture through a malignant tumor apppreciably hastens the death of an individual.

There are many causes of bone fragility, and the accompanying slides show a general classification of these causes.

CLASSIFICATION OF CAUSES OF BONE FRAGILITY

I. Congenital
   - Osteogenesis imperfecta

II. Conditions of Childhood and Adolescent (not subsequently listed)
   - Osteogenesis imperfecta (Infantile and later)
   - Osteopetrosis (marble bones; osteoporosis)
   - Gaucher's disease

III. Nutritional and Endocrine Disorders
   - Exhausting chronic diseases
     - Tuberculosis — diabetes — nephritis
   - Senility
   - Atrophy from disuse (wasted limbs)
   - Neuropathies
     - Tabes dorsalis — syringomyelia — myelomeningocele
   - Scurvy
   - Rickets
   - Osteomalacia
   - Osteitis fibrosa (parathyroidiam)

IV. Inflammatory Bone Disease
   - Pyogenic osteomyelitis
   - Tuberculous osteomyelitis
   - Lues (gumma of shaft of Charcot joint)
   - Osteitis deformans (Paget's disease)
   - Echinococcus disease with bone cysts

V. Bone Tumors
   - Benign
     1. Osteoma
     2. Osteochondroma
     3. Chondroma
     4. Giant cell tumor
     5. Angioma
   - Malignant
     - A. Osteogenic tumors or those derived from bone
       1. Osteogenic sarcoma
       2. Ewing's tumor
     - B. Tumors occurring in and around bone but not derived from osseous cells
       3. Myeloma
       4. Periosteal fibrosarcoma
     - C. Metastatic
       5. Carcinoma (breast-thyroid-prostate-uterus)
       6. Epithelioma
       7. Hypernephroma

*Read at the Fiftieth Annual Meeting of the American Association of Railway Surgeons, Chicago, September 13, 1939.

This classification shows a wide field of diseases in which fractures may occur. Because of the limitation of time and the subject of this paper, I can briefly discuss only selected parts of it, particularly those conditions which are part of adult life.

CYSTS: Most of the bone cysts, osteitis fibrosa cystica or cystic disease of the bone occur in childhood or early youth, but are not uncommon later in life. A pathological fracture may cure the simple small cyst, but these cyst formations are often large and fracture is not likely to cure the condition. Giant cell tumor arises usually in early adult life. Trauma may be the causative factor. It may resemble osteitic fibrosa cystica in that the cortex is thin. The tumor may invade the epiphysis but rarely the joint. There may be little pain but local tenderness. A pathological fracture is often the first indication of a giant cell tumor. Malignancy is very rare. X-ray therapy is used but it is often necessary to clean out the tumor and apply a bone graft.

METASTATIC BONE MALIGNANCY: By far the most frequent cause of metastatic carcinoma of the bone is cancer of the breast and the largest number of pathological fractures occur in these patients. In bone metastases, the growth is slow and fracture may be the first sign of the lesion. Pain may not be prominent early and the mild bone ache may be considered the result of some trivial injury until the x-ray later reveals a fracture. Most of these fractures are reported in the femur, ribs or humerus, but not uncommonly in the vertebrae. In a report of 637 cases of breast cancer, 24 had osseous metastases and 17% of the 24 showed fractures.

OSTEOGENIC SARCOMA: Osteogenic sarcoma is the most frequent primary malignancy of bone. Coley reported 21% of pathological fractures in this disease, which usually occurs in adolescence when growth is more active.

EWING'S SARCOMA: Ewing's sarcoma or endothelioma is much less frequent. Shafts of long bones are usually affected. It is a disease of childhood and adolescence, but occurs occasionally up to forty years. It may simulate osteomyelitis in its onset. The x-ray picture is one of extensive invasion over a large area or the entire shaft. There are relatively large numbers of pathological fractures.

MYELOMA: This is a very destructive lesion of bone, eventually involving many bones. X-rays show circumscribed areas of diminished density. The growth is slow and influenced by x-ray. Pain in these tumors is usually late. Pathological fractures are not uncommon.

ANGIOMA: Hemangioma of the vertebrae is thought to be uncommon, but one authority stated that in 3000 routine autopsies, 10% of spines showed this disease. Where present it may result in gradual crushing of a vertebrae unless recognized and the back supported.

OSTEOMYELITIS: Acute and chronic osteomyelitis results in pathological fracture more often than is suspected. I have the records of seven cases in which this occurred. Where a large localized abscess develops early with much destruction of bone, fracture may result within the first few days. As a rule, it is later episode in the stage of sequestra and necrosis and it often follows operation. If recognized early good union results.

SYPHILITIC DISEASE OF BONE: Syphilitic osteomyelitis may be as destructive as pyogenic osteomyelitis and fracture may result as readily. In tabes dorsalis there is marked fragility of bone, not infrequently resulting in spontaneous fracture from slight injury. Charcot reports a case in which fractures of three separate bones occurred.

SENILE OSTEOPOROSIS: This bone disease forms a large group of benign lesions of the vertebrae. Pain in the back, in the middle and lower part, and dorsal kyphosis calls attention to its presence. Compression fracture and ballooning of the intervetebral disc as the result of softening of the vertebrae is the usual occurrence. Fifty to 60 and over is the usual age limit. Many patients, if allowed to go on untreated, are severely invalided. Most of these patients are in the senior age group, where arthritis is very prevalent, and where they are vulnerable to complaints of slight trauma. The presence of muscle spasm which is so often a symptom leads to the diagnosis of an infectious or traumatic arthritis. Unless great care is exercised in recognizing the condition, compression fractures may occur. Support of the back, rest in bed, large doses of calcium with x-ray therapy may clear up the process before fracture results. It is certain that the real cause of these compression fractures is often unrecognized and in many instances the cost is considerable to industry.

THE following brief case records illustrate some of the factors involved in pathological fractures:

I. A. C., age 57, railroad engineer. Since October 14, 1938, had complained of pain in the lower back, extending down along each hip. He assigned this as resulting from a rough riding engine. His family physician diagnosed the illness as sciatica and he had been in bed for several weeks. On December 28, 1938, while putting on his trousers, while seated, he had sudden pain in the left hip and could not bear weight upon the leg. He was admitted to the hospital and x-ray revealed fracture of neck of left femur. Cast was applied. Patient was pale; appetite poor. Red blood count 3,500,000. Hemaglobin 70%. Gradual loss of weight, appetite. Died March 13, 1939. X-ray at no time showed anything suggestive of bone disease in hip.

Autopsy findings in brief: Ulcer of duodenum with erosion of vessel and considerable fresh blood in intestine. Hypernephroma of left kidney with metastases to lung, spleen, adrenal and neck of left femur. Fracture of neck of femur held together by soft tissue. There was tumor tissue within the fracture line. Cavity of femur contained a soft, red, friable tumor mass.

II. W. Z., age 48, had shoveled snow for several evenings in early January, 1936. Examined by me several days later because of pain and swelling at outer end of clavicle. Tender swelling over this area and x-ray suggested early osteomyelitis. Some subsidence of local distress and swelling noted but several weeks later all symptoms recurred. X-ray at this time showed a pathological fracture through

the clavicle and condition was diagnosed as probable myeloma. Subsequent involvement occurred in other clavicle, femurs, tibias, practically all long bones and spine. Patient lived three and a half years.

III. G. S., age 59, railroad employee. In September, 1937, claimed he sprained his back lifting a weight. One week later was unable to arise from bed without help. Had some improvement but always some pain in back. Worked until May, 1938. X-ray, May 16, 1938, reported as a narrowing of the 5th lumbar vertebrae and listing 4th lumbar vertebrae to the right. His surgeon reported to me that he believed this to be a compression fracture. He was given bed rest by him and later a brace support. Symptoms continued and he was readmitted to the service of his surgeon December 8, 1938. X-ray made at this time showed anterior erosion of the 2nd, 3rd and 4th lumbars and marked disintegration of the 5th lumbar. Patient died January 21, 1939.

Autopsy findings: Myeloma, involving several lumbar vertebrae and ribs.

IV. J. B., age 47. On July 18, 1938, was working in cage of a crane and his left leg suddenly gave way under him. He was able to get into his car and drive home but required help to get out of the car. The following morning upon going downstairs to breakfast, his leg seemed to lose power and he fell. He has been totally incapacitated and bedfast since that time. He denies he had any trouble with the leg previous to that time. Case is now involved in litigation. X-ray and other findings would indicate this to be a fracture through a Paget's disease involving upper end of femur and pelvic bones.

V. G. J., age 34. In the Winter of 1937 had a slight fall on the ice and sustained a fracture of the right humerus. He recovered from this. On March 12, 1939, was pushing a heavy stone and the arm was refractured at the same point. X-rays made July 6, 1939, showed a suspicion of cystic disease of the humerus and a section removed for biopsy showed osteitis fibrosa cystica. This case is also in litigation.

VI. Mrs. N. M., age 53. In June, 1935, had accident falling on street. Was incapacitated and bedfast. Examination showed swelling and tenderness above the knee joint and the question of some abnormal mobility suggesting a fracture. X-ray revealed a tumor involving the lower end of the femur. Diagnosis made of a giant cell tumor and she was operated upon by a surgical confrere on July 18, 1935. Cortex was found to be nothing but a thin shell of bone and the entire lower end of the femur was involved. Laboratory reported the disease as a giant cell tumor with areas of atypical osteogenesis.

VII. W. L., age 53, railroad engineer. In March, 1938, carcinoma of lower lip was excised. In April, 1939, he developed a severe bronchitis. During a paroxysm of coughing he had a sudden severe pain in the chest wall. Was forced to discontinue work. X-ray revealed fracture of two ribs and a probable metastases to lung, believed to be secondary to the carcinoma of the lip.

VIII. Mrs. I. M., age 47. Amputation of left breast for carcinoma performed in April, 1937. In May, 1938, upon reaching for an object she sustained a spontaneous fracture of the right humerus which united. On December 21, 1938, she was walking across the floor when both legs seemed to give way and she fell to the floor. She had very little pain in either leg. X-rays showed a pathological fracture of the left femur through the neck and of the right femur through the shaft. She obtained union in both of these fractures. She has a mass within the abdomen which is believed to be an extension of the carcinoma of the breast. She is gradually losing weight and her general health is poor. It is believed that she will live no longer than a few months.

IX. J. M., age 38. In March, 1939, developed an abscess of the chest wall. Several weeks later had sudden severe pain in the region of the hip with elevation of temperature, local tenderness and all signs of an acute osteomyelitis. Operative incision was made to the upper end of the femur and a large collection of pus evacuated. Several days later upon turning in bed, he noted acute pain and a sensation of the bone fracturing at the region of the osteomyelitis. X-ray and local examination showed a fracture just below the neck of the femur. He is still under treatment in the hospital and seems to be developing union in the fracture.

X. D. K., age 59. Policeman. In 1938 assisted in a slight lift. Shortly afterwards began to complain of pain in the lower back, general weakness and difficulty in straightening his back. Was treated for arthritis by his family doctor for some period. After several months examination by a consultant and x-rays revealed some slight crushing of a vertebrae and local symptoms in the back believed to be the result of osteoporosis. Under rest and support has made marked improvement with decrease in symptoms and ability to return to work. He noted no evidence of injury at the time of lifting, but when he developed soreness and pain in the back some days later, he believed it to be due to this lift.

SUMMARY: Pathological fractures are frequent enough in occurrence and there is the coincidental claim of injury in so many cases, that the consideration of the relationship to industrial injury is of value. Seventeen of the 28 cases collected in this study claimed injury as the immediate cause of the fracture and seven of the injuries did not occur at their place of employment. Most of the injuries were slight and except for the presence of bone disease, would have been of no moment. In 11 cases of pathological fracture there was no claim of distinct injury. In 35% of the patients trauma in various types of employment was claimed to have a connection with the disability. Perhaps a larger series of fractures might change this percentage.

Industrial Nurses

THE First Annual Symposium for Industrial Nurses, presented by the DEPARTMENT OF PUBLIC HEALTH OF THE STATE OF ILLINOIS, A. C. Baxter, M.D., Director, Division of Industrial Hygiene, and the DIVISION OF CHILD HYGIENE AND PUBLIC HEALTH NURSING, will be held at the University of Illinois Medical School, 1853 West Polk Street, Chicago, on October 26, 27, and 28, 1939.

The Collaborating Organizations include Chicago Industrial Nurses Association, Greater Chicago Safety Council, Illinois Manufacturers' Association, American Industrial Hygiene Association, American Medical Association, and University of Illinois Medical School.

The program, excellent, comprehensive, follows:

Thursday, October 26, 1939:

1:00 P.M. Registration (No registration fee). University of Illinois, College of Medicine, 1853 West Polk Street, Chicago.

Presiding: Dr. C. C. Applewhite, Regional Consultant, U. S. Public Health Service, Chicago.

2:00 P.M. Address of Welcome: Dr. D. J. Davis, Dean, College of Medicine, University of Illinois.

2:10 P.M. "Modern Trends in Industrial Nursing Services," Miss Joanna Johnson, R.N., Supervisor, Nursing Service, Employers' Mutuals, Wausau, Wisconsin.

2:45 P.M. "As the State Department of Public Health Views the Industrial Nurse," by Miss Maude B. Carson, R.N., Chief Supervising Nurse, Illinois State Department of Public Health, Springfield.

3:15 P.M. "The Role of the University in the Preparation of the Industrial Nurse," (Speaker to be announced).

3:45 P.M. "The Viewpoint of the American Medical Association," by Dr. Carl M. Peterson, Secretary, Council on Industrial Health, American Medical Association, Chicago.

4:15 P.M. Discussion, 30 minutes.

Friday, October 27, 1939:

10:00 A.M. Plant visits. (Three groups, number limited). (1) Crane Company, 4200 South Kedzie Ave., Chicago. (2) Western Electric Company, Cicero & 22nd Street, Chicago. (3) International Harvester Company, 26th & Blue Island Avenue, Chicago.

Afternoon Session:

Presiding: Mr. Warren A. Cook, President-Elect, American Industrial Hygiene Association.

2:00 P.M. "What the Nurse Should Know About the Compensation Law," by Hon. Peter J. Angsten, Chairman, Industrial Commission of Illinois.

2:30 P.M. "New Developments in the State Department of Public Health Through the Social Security Act," by Dr. Grace Wightman, Chief, Division of Child Hygiene and Public Health, Nursing, Illinois State Department of Public Health, Springfield.

3:00 P.M. "The Value of Records in Industry," by Dr. M. H. Kronenberg, Chief, Division of Industrial Hygiene, Illinois State Department of Public Health, Chicago.

3:30 P.M. "Social Service Agencies and the Industrial Nurse," Chicago Area, Mr. Alexander Ropchan, Secretary, Health Division, Council of Social Agencies, Chicago.

4:00 P.M. Downstate Area, Miss Ruth Bartlett, Illinois State Department of Public Welfare, Springfield.

4:30 P.M. Discussion, 30 minutes.

Evening Session:

6:30 P.M. Dinner Meeting: Chicago Womens Club, 72 East 11th Street.

Presiding: Dr. Albert C. Baxter, Director, Illinois State Department of Public Health, Springfield.

"The Medical Director Evaluates the Nurse in Industry," by Dr. Joseph H. Chivers, Medical Director, Crane Company, Chicago.

"The Nurse's Value to Industry from the Employer's Viewpoint," by Mr. Harry Guilbert, Director, Safety and Compensation, The Pullman Company, Chicago.

"Opportunities for Health Education in Industry," by Mr. B. K. Richardson, Chief, Division of Public Health Instruction, Illinois State Department of Public Health, Springfield.

Saturday, October 28, 1939:

Presiding: Dr. Lloyd Arnold, Professor, Department of Bacteriology and Public Health, University of Illinois, College of Medicine.

9:00 A.M. "The Industrial Nurse as a Teacher of Nutrition," by Miss Leone Pazourek, Nutritionist, Illinois State Department of Public Health, Springfield.

9:30 A.M. "Personnel Problems and the Industrial Nurse," (Speaker to be announced).

10:00 A.M. "The Communicable Disease Problem in Industry:"

"Pneumonia," by Dr. H. A. Lindberg, Director, Section on Pneumonia Control, Illinois State Department of Public Health, Chicago.

"Tuberculosis," by Dr. Ellis B. Freilich, Consultant, Chicago.

"Venereal Disease," by Dr. Albert E. Russell, U. S. Public Health Service, Chicago.

11:15 A.M. "Summation," by Mrs. Corrine R. Robinson, R.N., Consulting Nurse, District 1, Illinois State Department of Public Health, Chicago.

11:40 A.M. Discussion, 20 minutes.

Air Hygiene Foundation

THE Air Hygiene Foundation of America, Inc., of Pittsburgh, Pennsylvania, "is a partnership of industry and science, formed by employers to protect the health of America's industrial workmen." Its researches, surveys, and other membership services "aid and augment health programs carried on by companies individually." This on the basis of the socio-economic developments of the present, wherein "law, labor, and public opinion call for employee health protection on an industry-wide scale." Among its offerings to members, the Foundation:

Conducts scientific studies and investigations to find ways and means to prevent occupational diseases, and to safeguard the health of workmen.

Collects and evaluates industrial health information and serves as a central clearing house for disseminating these data.

Serves as a unifying agent, aiding in the advancement of industrial hygiene on an industry-wide front; supplements health work carried on by member companies individually, affording the advantages of organized action.

Develops and distributes knowledge needed to combat industrial ills. Research is sustained at present at four leading science centers: The Saranac Laboratory, Harvard School of Public Health, University of Pennsylvania, and Mellon Institute, headquarters of Air Hygiene Foundation.

Issues informative bulletins giving practical engineering measures and medical information for controlling employee health hazards. Periodic legal reports analyze occupational disease legislation, trends, compensation, etc.

Makes plant surveys for members at cost. Special studies are undertaken or supervised for members or groups of members. A counsel of specialists, comprising the Foundation's Engineering, Medical and Legal Committees, is available within reasonable limits.

Provides a monthly "digest" of latest literature on occupational health. This "news service" reduces hours of reading to minutes, and insures members against missing vital developments.

The following are from the current "digest":

"Tuberculosis in Industry." A. R. Riddell. *Canadian Pub. Health J.*, 30, 156-160, March, 1939.

The author concludes that "although the relation of certain occupations to the occurrence of tuberculosis is somewhat disquieting, industry in general does not constitute a menace in this respect." He states that "industrialization has so raised the general standards of living as to more than counteract any adverse influence which specific industries exert." Insurance reports indicate a higher death rate among industrial as contrasted with non-industrial groups in the same community. The influences which may exert an adverse effect on an industry's tuberculosis rating are discussed, particularly posture and overcrowding.

The results of various surveys of overcrowded plants are revealing. The importance of tuberculosis in relation to silicosis is illustrated by observations on a series of 375 cases which occurred in Ontario during the past 10 years and one group in one of the northern mining camps, where the transmission of tuberculosis to contacts was particularly noted. The economic aspect of tuberculosis exerts a severe strain on the community and industry, and the results of treatment so far as the individual workman is concerned are not encouraging, few are ever again permanently self-supporting. The necessity of preventive measures for early detection of cases is pointed out. Such measures should include chest roentgenograms, supplemented by laboratory facilities.

"Occupational and Economic Factors of Mortality," M. GREENWOOD. *Brit. Med. J.*, pp. 862-6, April 29, 1939.

This Chadwick lecture is based upon the occupational decennial reports of the Registrar-General with special reference to the last of these reports which deals with the years 1930-32. The first of the series was the work of William Farr in 1851. His successors Ogle, Tatham and Stevenson, each in his turn added something to the method and value of the method and value of the reports. In the hands of Dr. Stocks the latest report contains many new and important characteristics. The primary object throughout has been to show the influence exerted by occupation upon health, as measured by mortality. Industrial diseases have thus been exposed, in particular those due to inhaling dust, of which silicosis is the outstanding example. By grouping occupations into great social classes the influence of prosperity or want is displayed; and this influence is further established now by including information about the wives of occupied men. Clearly, if both the wives and the men exhibit a similar tendency to succumb to some cause of death, we cannot fairly ascrilbe this tendency to some occupational exposure of the man. We have rather to study the social and geographical environment in which the wives share. Here the density factor known as housing, still plays an important part, even though less manifest than in the days of Simon and Chadwick. We have to rely even today upon mortality to measure good or evil influences, as we sadly lack information concerning morbidity, and means for correlating sickness with occupational factors.

"Watching Over Health." A. G. KAMMER. *Nat. Safety News*, 40, 34, 35, September, 1939.

The industrial physician makes his chief contribution toward a higher health level in the employees through complete physical examinations. A program for employee examination is proposed and described in this paper.

"The Cement Burn." J. M. MEHERIN and T. P. SCHOMAKER. *J.A.M.A.*, 112, 1322-1326, April 8, 1939.

The author finds the literature on cement burns meager. He presents in a table an average composition of Portland cement (lime 62%, silica%, etc.) and concrete (gravel 55%, sand 29%, cement 8%, water 8%). The pH of cement in solution varies between 11.5 and 12. Five definite factors occur in the production of the burn: (1) abrasive action while manipulating concrete, (2) friction, (3) heat of solution, (4) marked hygroscopic action, and (5) alkaline corrosive action. Sixty cases are reported which had a total disability of 640 days, or an average of 10 days each and an average treatment of 14 days each; seven required hospitalization, of which six were infected although infections occurred in a total of 13 cases. Pain was the chief symptom bringing the patient to the doctor's office. Cement burns are theoretically preventable by the use of dry boots and gloves, frequently changed, showers and compulsory bathing, and the application of heavy petroleum where practical. Treatment consists in prompt lavage with water, never with chemical neutralizers. The crust which forms is usually loosened within 24 hours by soothing ointment, leaving a fairly clean, ragged but simple ulcer. Once clean granulations appear, cod liver oil in ointment proved satisfactory.

"Control of Lead in the Steel Plant." E. D. MARTIN. *Metal Progress*, 35, 457-63, May, 1939.

Lead, in concentrations as low as 0.25% in steel, imparts to the metal certain beneficial qualities without the sacrifice of essential properties. The manufacture and use of the lead-steel alloys has led to the necessity of adopting certain rules pertaining to hygienic conditions in the plants. The first part of this paper is devoted to the elementary principle of lead absorption and lead poisoning in the body, following which is a discussion of the air sampling apparatus and technic that are generally used. In one particular plant lead samples at a number of points showed the most hazardous locations where it was necessary to install local exhaust ventilation to bring the average exposure below dangerous levels. Measurements were made out-of-doors also to estimate possible atmospheric pollution by the steel plant. The result of the survey and the application of the methods of dust and fume control showed that it is not unreasonably expensive to control an occupational hazard. A succeeding article is to tell of the problems involved in the plant of users of leaded steel, such as in welding, burning and handling.

"Benzine Poisoning." Edited by B. BEHRENS. *Samm. v. Vergiftsf.*, 9, Bull. No. 10, 69-74, 133-150, 1938.

One of the authors, H. H. Jansen, describes observations on neuritis ischiadica and traumatic epilepsy after acute benzine poisoning. In the first case there was injury to the nerves of the legs with almost no tendency to heal. The second case was considered as one of epilepsy directly related to the poisoning. The third was a case of early traumatic epilepsy after acute benzine poisoning as a result of prolonged injury (localized). Another author, F. Quensel, describes a case that was first thought to be one of disseminated cord disease from acute benzine poisoning. Some years later Quensel had the opportunity of examining the patient again. A section showed the presence of centers of multiple sclerosis. On the basis of these findings, the disease and accident history, a connection between the benzine poisoning and the sickness was not accepted. The appearance of multiple foci of softening after acute benzine poisoning thus has not been proved.

"Acute Arsenic Poisoning." W. A. PORTER, *Virginia Med. Monthly*, 66, 148-151, March, 1939.

Besides the usual treatment of arsenic poisoning Porter used 800 international units of vitamin B_1 daily. The salient feature in the patients receiving the vitamin was the absence of diarrhea. It is his belief that the use of vitamin B_1 has a definite place in the treatment of toxic neuritis from metal poisoning. Prompt improvement of neuritic pains occurred after the vitamin B_1 had been administered for only a few days.

"Syphilis Control in a Chemical Industry." G. H. GEHRMANN. *Am. J. Syph. Gon. Ven. Dis.*, 22, 623-30, 1938.

The author, as medical director of the duPont Company, supervises the health of 40,000 workers, and he writes of the problems involved in syphilis control. Syphilitics must not be allowed to work where conditions may aggravate the disease, and must not work with materials (such as cellophane) that might spread infection among the general public. The syphilitic in a modern, sanitary plant is not considered likely to infect his fellow workers, and he does not seem more prone to such complications as infections or poor union of fractures. Corneal ulcers, however, do seem more common among infected persons. Since 1934 the company has had its own serological laboratory where an average of 100 Kahn tests have been made every day. All new employees are tested and many others retested annually. Old employees who become infected cannot remain unless they take adequate treatment. The company now gives free treatments to all who cannot get proper treatment elsewhere. This practice was begun when it was found that sending workers to their own doctors or to clinics did not have satisfactory results.

"Dermatitis Caused by a New Insecticide." L. SCHWARTZ and L. H. WARREN. *U. S. Public Health Reports*, 54, 1426-35, August 4, 1939.

Experiments on animals with most of the insecticides show that they are toxic and irritating to the skin, and in sufficient concentration are capable of producing death. The petroleum distillate which is usually used as a solvent for the insecticide is also toxic and, if not specially treated,

is irritating to the skin. The new insecticide reported here is a product known as alpha naphthyl isothiocyanate, usually mixed with pyrethrum to obtain the toxic effect.

Current Comment

EMERY R. HAYHURST, M.D.
Columbus, Ohio

IN "an X-Ray Study of the Lungs of Workmen in the Asbestos Industry, Covering a Period of Ten Years," ARIAL W. GEORGE, M.D., and RALPH D. LEONARD, M.D.,* describe an intensive study of workers exposed to the asbestos hazard in a large industrial plant in Massachusetts, where brake linings were manufactured. This study was begun in 1928. The asbestos contained somewhat less than 30% silica. Dry weaving was first used, later changed to wet weaving. Of all cases examined in 1928 and 1929, 12 were diagnosed as asbestosis by x-ray findings. These were put on compensation or given a lump-sum settlement. They represented a very small number of the total employees. Three cases were definitely advanced, but without many of the usual clinical signs, and would not change their occupation. These remained with the plant until it was closed in 1936, and one of these became a litigant.

Within a short time after the closing of the plant, 90 other workmen brought in claims for disability due to asbestosis. These were examined and positive diagnoses of asbestosis made on 12 with three additional cases questionable. About 13% of these 90 cases claimed symptoms. The insurance carrier immediately arranged compensation or settlement in excess of $50,000 for these 12. Of the remaining 78, 30 came to trial. The Legal Aid Society furnished able counsel and the late John B. Hawes, Jr., M.D., became the medical expert for them and made a positive diagnosis in the 30 cases. The referee committee of three so-called "Panel Doctors" (one a roentgenologist), whose diagnosis is final, examined 10 of these 30 cases without finding definitely stated asbestosis, but their findings were reported as, "consistent with," or "a slight degree of," or "the probability of" asbestosis. They were obviously depending upon the history of exposure and not on the x-ray findings alone. This feature of exposure appeared also to influence Dr. Hawes in some 80% of his positive diagnoses. He based his diagnosis and prognosis upon: (1) History of exposure, (2) difficulty in breathing on exertion, (3) cough, (4) rapidity of heart action on exertion, and (5) "that asbestosis was a progressive disease, once contracted, whether the individual remained in the industry or was removed."

The authors find also that a large number of asbestosis cases gave the history of coughing up blood. Irritation on the hands may develop into open ulcers whose bases show asbestos fibers imbedded in the deep layers of the skin. Probably a similar condition may develop in the air passages. Certain individuals seem sensitive and others immune, for which no satisfactory explanation is at hand unless possibly the method of breathing.

Re-examination of the 12 original cases, made at the time of one of the hearings, showed them to be free of all symptoms and, except for several women in their group, they were doing laborious work in new occupations. This was eight or nine years after their original cessation of exposure. It is evident that if a history of exposure is eliminated, a positive clinical diagnosis of asbestosis cannot be made and reliance must be placed upon the x-ray examination. Further, it appears that asbestos dust will not give symptoms until there are visible changes in the x-ray film.

The more characteristic findings are described in detail, briefly summarized as: Bilateral distribution limited to the lower lobes of both lungs, at first as a "ground glass" or "smoky" appearance; absence of gross nodulation — what nodulation there is has a fine, evenly distributed quality; no characteristic hilum or root shadow changes although there is often some accentuation of the bronchial shadows which present a laminated appearance in the lower lobes (probably localized emphysema with atelectasis); accentuation of interlobar pleural septa; lower chest pleuritic adhesions with obliteration of the costophrenic angles; emphysema; and more dilatation of the right heart than seen in other pneumoconioses but no demonstrable dilatation of the pulmonary artery. No cases of complicating tuberculosis were found nor was there evidence of asbestosis lighting up a preexixsting tuberculosis.

Differential diagnosis would include other pneumoconiosis, especially silicosis; tuberculosis; lower lobe congestion from various causes; accentuation of the bronchial shadows in the lower lobes; and chronic bronchitis or bronchiectasis, but neither of these latter conditions usually show an associated "ground glass" appearance.

The authors conclude that each asbestos industry and exposure must be an especial study in itself; the percentage of silica must be taken into consideration and whether the methods used were dry or wet; asbestosis is not a progressive disease after the individual is removed from the dust exposure; there is no evidence of any causal relation to tuberculosis; final diagnosis must depend mainly on x-ray evidence, there being no pathognomonic clinical findings; and that an amount of asbestosis dust in the lungs, sufficient to produce symptoms, will give visible evidence on the x-ray film.

* In *Radiology*, Vol. 33:196-202 (August) 1939.

Toxic Fumes

—*in Massachusetts Industries*—

HERVEY B. ELKINS,
Chemist,
Massachusetts Division of Occupational Hygiene,
Boston

MOST occupational diseases fall roughly into one of three groups:

1. Dust diseases;
2. Occupational dermatoses;

3. Poisoning by toxic fumes and gases.

Of these three categories the first have received the most attention; the second are the most numerous; and the third are the most varied and form the subject of this discussion.

While the dust diseases affect primarily the lungs, and dermatoses are by definition skin diseases, toxic gases and fumes may act selectively on any part of the body. For example, the lining of the nose, the very doorway to the system, is attacked by chromic acid; while the bladder, almost the last organ which contacts waste matter before it is eliminated, is the site of tumors caused by some amino compounds used chiefly in making dyes. Many other toxic fumes attack the lower respiratory tract, liver, kidneys, blood-forming mechanism and nervous system. In variety of action on the body the gases and fumes are certainly the most interesting of the occupational hazards.

LEFT: Dope room of an artificial leather factory. Open mixers are important sources of benzol vapor. RIGHT: Same, after installation of ventilating equipment. Even with tubs of dope and mixers covered, appreciable concentrations of solvent vapor escape. Ventilation is therefore necessary.

It has been shown innumerable times that most industrial poisonings occur through the respiratory tract, i.e., they are caused by breathing in the toxic agent, which may be in the form of a gas, fume, or dust.

The industrial hygienist recognizes this as axiomatic, but others do not always do so.

We recently learned of several cases of lead poisoning among painters engaged in coating structural steel with red lead paint.

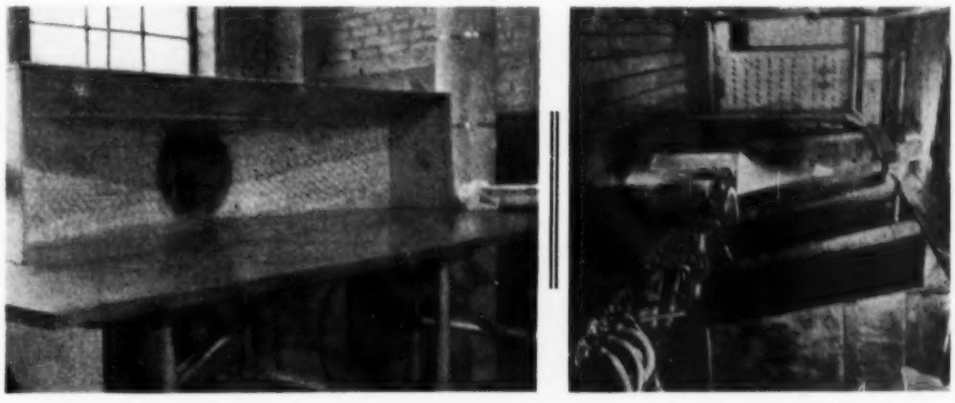
Three theories of how these cases occurred were advanced. The paint was partly sprayed and partly brushed. Water was supplied the painters in an open pail, and it was found that this was frequently well flavored with red lead paint from the spray. This source of lead absorption was considered the most important by one investigator.

We claimed it was inhalation of spray, while the employer said it was carelessness on the part of the men, especially that they did not clean the lead out from under their finger nails.

Now in this case there were three classes of workers — brush painters, spray painters, and helpers. The helpers and brush painters got lead poisoning, the sprayers did not. Further investigation did not show that the sprayers drank less water than the others, nor was it shown that their hands were manicured more frequently than the others'.

It was shown, however, that while all worked in the paint spray, only the sprayers had respirators, and therefore inhaled less lead than the others, even though the atmosphere around possibly contained more lead than that around the other workers.

Because contamination of the air is the chief source of poisoning, it follows that a first step in preventive effort is the development of apparatus and technique for the measurement of the quantities of these various toxic materials in the atmosphere, and the formation of organizations capable of making such measurements. During the past few years great advances have been made in this direction, and now about half the States, many of the insurance companies, and several independent laboratories are equipped to determine almost any toxic fume which may be present in the air of an industrial plant.



LEFT: Table for fur cleaning, fitted with hood and exhaust. Sponging furs involved exposure to 10 parts per million of carbon tetrachloride vapor at this table. Without protection, this process gives off up to 300 parts per million. RIGHT: Acid pickling vats with wooden hoods and baffles for controlling fumes.

It is not enough to find out how much of a given fume is present in the air, however. We must

know approximately what effect, if any, the concentration found will have on the workers breathing in that air. Analysis of air in plants where poisoning cases have occurred will only give us part of the story. For example, we once took some samples of air for pentachlornaphthalene in a plant where two deaths had occurred apparently caused by exposure to the fumes of that material. We found a concentration of between 1 and 2 mg. per cubic meter of air. From that we could state that concentrations of 2 mg. or over were unsafe, but we could not say that below 1 mg., or 0.5 or even 0.1 mg. was safe. To do that it is necessary to examine a very large number of workers exposed to varying concentrations and show that injury occurs only when a certain concentration is exceeded. Researches of this type have been made for three toxic fumes: benzol, lead and mercury, the results of the last not yet available to the public, however. Such a study requires months of work, complete medical as well as chemical facilities, and in addition a large group of workers exposed in varying degree to the substance being studied.

This involves the further drawback that a good many workers must get poisoned before the study can be made. A quicker, cheaper, and more humanitarian method of determining safe concentrations is desirable. Such a method is that of toxicological studies on animals. Innumerable researches of this sort have been carried out. If one is interested in the toxicity of any substance, especially a gas or metallic compound, he will almost always find records of experiments where rats or guinea pigs have breathed in, swallowed, or had injected into them varying quantities of the substance.

If such data are lacking, the probability is that the material is a very recently developed or discovered one, or else its toxicity is so small that it has comparatively little interest for the experimental toxicologist.

When we attempt to apply the results of such studies to industrial exposures, however, we run into immediate difficulty.

For example, some tests of this kind were made by Lehman and Hess on carbon tetrachloride. They found that 24,000 to 32,000 ppm. were dangerous, and that 10,000 ppm. would cause some ill effects after an hour's exposure, while 1600 ppm. had a slight effect after several hours' inhalation. Compare these concentrations with those found in industry, where nausea and vomiting invariably occur if workers are exposed to concentrations appreciably in excess of 100 ppm., or $\frac{1}{16}$ the lowest concentration used by Lehman.

It is necessary, therefore, to be highly critical in making use of such data.

Now to digress for a moment. I plan to show some tables listing figures and quantities proposed for threshold concentrations and then to show some data on what tests in this State have shown in the way of safe and unsafe concentrations. Before doing this, however, I should like to quote from the report of a legislative committee in another State on a survey of occupational disease hazards in that state. This survey included all the industries in the State and estimates of the numbers of workers exposed to various toxic agents, but no quantitative measurements were made. The report says in part:

"The Committee asked for facts, figures and proof that conditions did or did not warrant action of a legislative nature. The Committee got a voluminous report in which no quantitative estimations were recorded, and in which the meaningless expression 'exposed to' was used to report on the presence of injurious substances.

"In no instance did the survey report indicate the exact amount of harmful substances present. In no instance did the survey findings establish concentrations below which damage to health would not result and nowhere in the survey report is any mention made that the whole world is 'exposed to' organic and inorganic dusts, volatile solvents, mineral dusts, alkaline compounds, gases, infections, oils, fats and waxes in the course of their daily life."

It is only fair to add that this was the minority report, and the majority report was less critical, but the point of view represented deserves serious consideration. I have read this excerpt primarily in order to forestall a different criticism, that of being too quantitative, in the remainder of this talk.

In order to obtain data on as many toxic fumes as possible which might affect the workers of this

TABLE I.

MAXIMUM ALLOWABLE CONCENTRATIONS

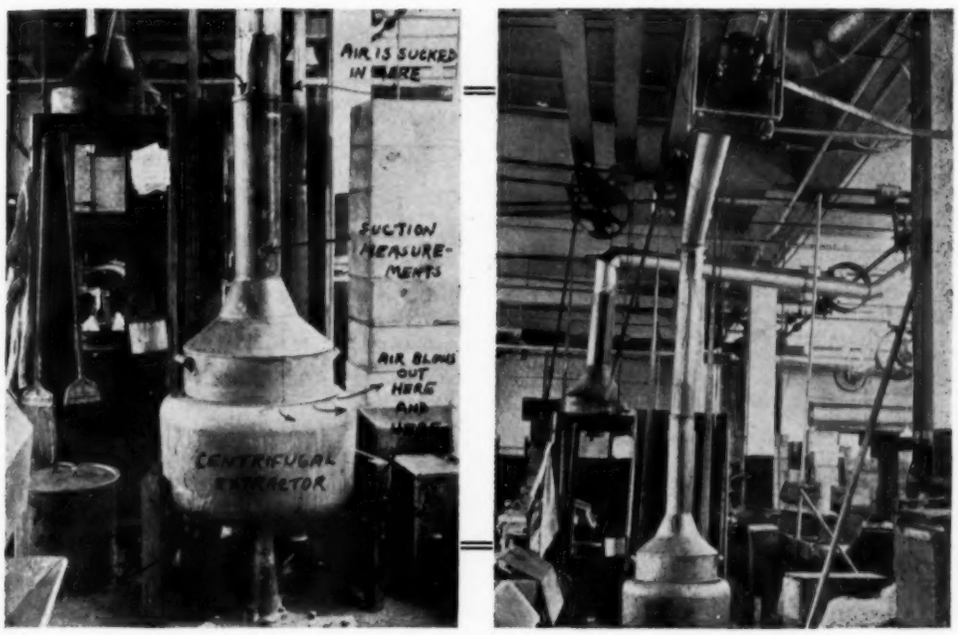
Solvents	PPM.
Amyl acetate	400
Aniline	5
Benzol	75
Butyl acetate	400
Carbon bisulfide	15
Carbon tetrachloride	100
Dichlorbenzene	75
Dichlorethyl ether	15
Ether	400
Ethylene dichloride	100
Methanol	200
Monochlorbenzene	75
Naphtha, gasoline	1000
Nitrobenzene	5
Tetrachlorethane	10
Tetrachlorethylene	200
Toluol	200
Trichlorethylene	200
Turpentine	200
Xylol, coal tar naphtha	200

Gases	PPM.
Arsine	1
Ammonia	100
Carbon monoxide	100
Chlorine	1
Formaldehyde	20
Hydrogen cyanide	20
Hydrochloride acid	10
Hydrogen fluoride	3
Hydrogen sulfide	20
Nitrogen dioxide	10
Ozone	1
Phosphine	2
Sulfur dioxide	10

Metallic Compounds, Fumes—MGM³	
Cadmium	0.1
Chlorodiphenyl	1.0
Chromic acid	0.1
Lead	0.15
Mercury	0.1
Pentachlornaphthalene	0.5
Trichlornaphthalene	5.0
Zinc oxide fume	15.0

State, we prepared a table of existing threshold or maximum allowable concentrations, and added some tentative proposals for this State.

This list was sent out to some 19 American and eight foreign authorities, and their suggestions and criticisms were requested. All but two of the American, and four of the foreign experts sent in comments. These were tabulated and then considered in detail by the Massachusetts Dust and Fume Code Committee. After carefully going over all the evidence, and in some cases making further studies of the literature and undertaking special determinations of the concentration of gases present in typical industrial atmospheres, values were proposed for some 40 substances. These are shown in Table I. It is believed that this is the most complete and thorough compilation of maximum allowable concentrations for industrial gases and fumes yet prepared.



LEFT: Extractor for metal cleaning operations. In spite of its being closed and exhausted, ethylene dichloride vapor escaped from this system. RIGHT: Same, with strong exhaust which reduced escape of solvent vapor to safe level.

A few changes from previously recommended values should be explained. The concentrations for hydrogen sulfide suggested by the other authorities in this country range from 50 to over 100 ppm. We have found that in rayon spinning rooms conjunctivitis or eye irritation is common unless the H_2S is kept below 20 ppm. and will not be eliminated if 10 ppm. are exceeded.

For nitrogen dioxide a threshold concentration of 40 ppm. is usually given. This value seems high to us, especially since the active agent is nitric acid, which is at least as corrosive as hydrochloric acid. We therefore proposed 10 ppm., the same figure as commonly given for hydrochloric acid. Several chemists when they have seen this list have criticized this low value for hydrochloric acid, for this substance is handled freely and with relative impunity in the laboratory and in industry alike. Hydrogen cyanide and carbon monoxide, on the other hand, are much more dangerous, but the allowable concentrations given are higher. The reasons for this are two: first, hydrochloric acid is very soluble in water and very little escapes, even from concentrated solutions; second, hydrochloric acid is an irritant gas, very unpleasant to breathe and injurious concentrations will not be tolerated, as a rule, if escape is possible. Even though serious poisonings by hydrochloric acid are rare, while fatalities from carbon monoxide, which has practically no odor, are common, the fact still remains that no person who knew what he was about would prefer staying in a room with 100 ppm. hydrochloric acid to one with the same concentration of carbon monoxide.

I might point out that in setting up these values, we consider primarily the average exposure throughout the day or week, and not the momentary exposure. In some cases, however, as with the irritant gases, the maximum concentration should not be exceeded for even periods of a half hour or so.

In the second column the solvents, 20 in number, are given. These are somewhat less toxic than the gases, the lowest safe value being set at 5 ppm. for aniline and nitrobenzene. Carbon bisulfide, dichlorethyl ether and tetrachlorethane are also rated as extremely toxic. Benzol, carbon tetrachloride, ethylene dichloride and the chlorbenzenes are rated highly toxic, with trichlorethylene, toluol, xylol and methanol somewhat less so. The lacquer solvents, butyl and amyl acetate and ether, are still less toxic, with naphtha the least toxic of all. I would class acetone, ethyl acetate and alcohol with naphtha.

Metallic compounds and fumes number eight in all, of which three are the heavy metals, lead, mercury and cadmium, and three are chlorinated aromatic compounds, some of which cause liver damage. The concentrations of these are given in milligrams per cubic meter of air, as they are not usually present in vapor form. These concentrations are much lower than those given for gases and solvents. The value for mercury, for example, corresponds to 0.01 ppm. This is not surprising as these substances are relatively non-volatile and it is not easy to maintain high concentrations in the air. Materials of this sort are usually not hazardous unless they are extremely toxic.

So much for these values for maximum allowable concentrations. The figures themselves are

of interest chiefly to industrial hygienists. What is of more interest to the employer, the worker and the public is what substances are present in the air of industrial plants in concentrations likely to be injurious to health. The data which we have obtained in answer to this question during the past four years are shown in Figs. 1 to 4.

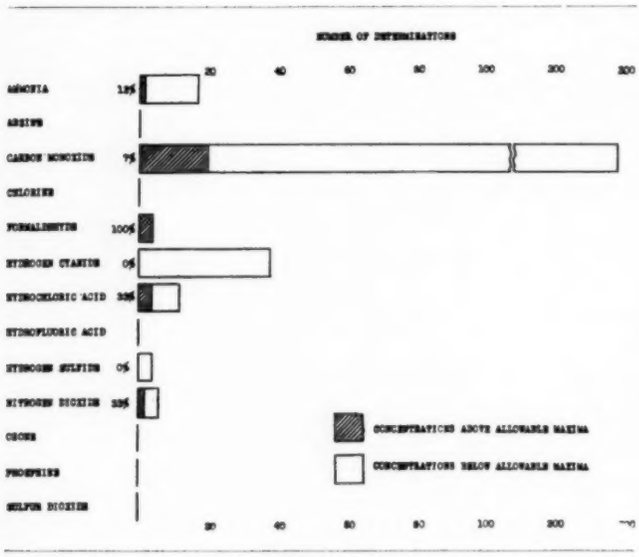


Fig. 1.

Fig. 1 shows the results of the tests made for gases. The length of the bar is an indication of the number of tests made, the shaded portion shows the number of concentrations found above the threshold figure listed in Table 1. Figs. 2, 3 and

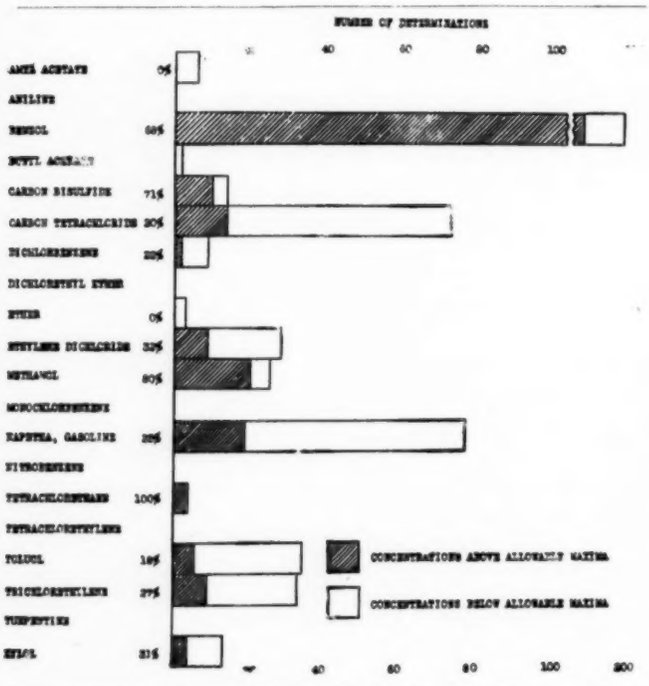


Fig. 2.

4 show similar data for solvent vapors, fumes and dusts, and substances not listed in Table 1, repectively.

It is seen that carbon monoxide, benzol and lead were tested for most frequently, but that presumably injurious concentrations were found rarely for carbon monoxide, and rather frequently for lead and benzol, as well as several other vapors and fumes which were encountered less commonly. In some cases the exposure was intermittent, so that a single test showing a concentration above the maximum allowable value does not necessarily indicate a hazardous condition, but it does mean at least a potentially hazardous one.

The work done on hydrogen cyanide requires some comment. Next to carbon monoxide it was tested for more frequently than any other gas, but no values above 20 ppm. were found. We made some tests in one plant where electroplating was being done, and some of the plating baths were

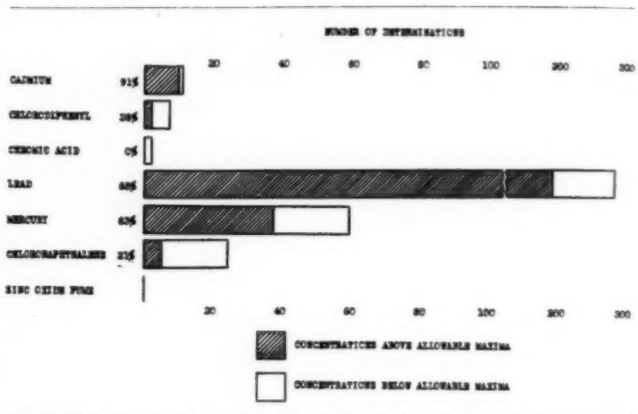


Fig. 3.

said to be gassing or giving off fumes of cyanide. When we entered the room we found most of the workers in a large area, some nearly 100 ft. from the offending tanks, wearing respirators. There was a very slight sharp smell, but no strong odor of hydrogen cyanide. We spent three hours taking air samples, and toward the end began to notice a slight nasal irritation. This rapidly increased

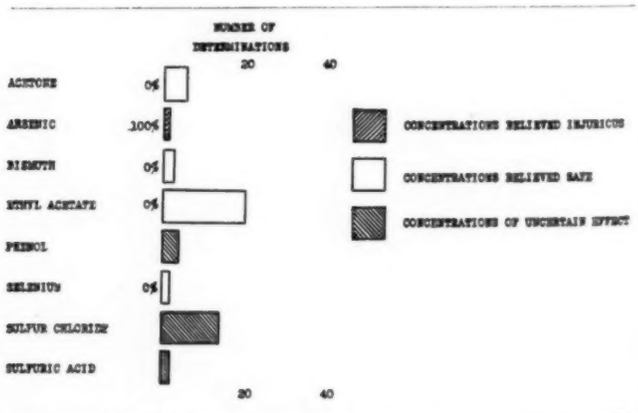


Fig. 4.

and on the way home I felt as if the lining of my nose was eaten out. Yet the analysis of the samples showed only 5 ppm. of hydrogen cyanide, an entirely safe concentration according to our chart. But the situation obviously called for improvement. The answer apparently is that the fumes consisted chiefly of a spray of sodium cyanide, which had a local irritating action, rather than hydrogen cyanide, which has an entirely differ-

ent effect. Obviously we need a different threshold concentration for fumes of this type.

Attention is called to the tests made on chloronaphthalene and chlorodiphenyl. The concentrations found were in most cases below the threshold values.

Fig. 5 gives some idea how the concentrations of certain fumes run in industries where they are encountered. The vertical scale indicates the per-

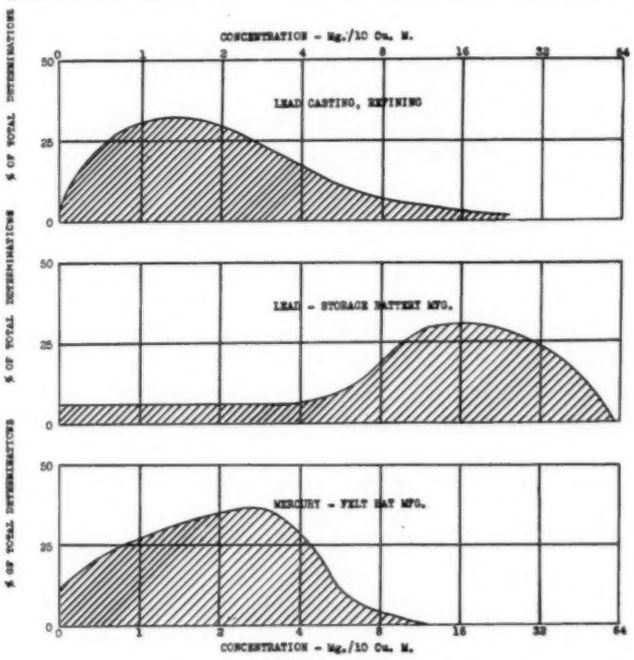


Fig. 5.

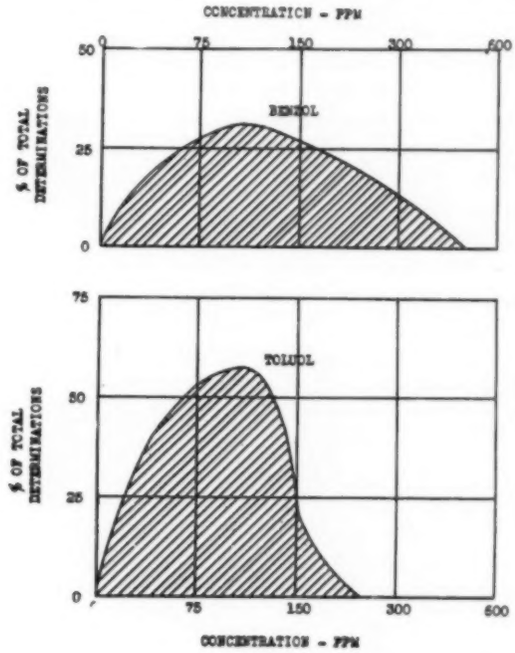


Fig. 6.

centage of the total number of tests falling within a certain range of concentrations, shown on the horizontal scale. Note that after the first space each succeeding space represents twice as great a range as the preceding one—1-2, 2-4, 4-8, etc. We see that in the refining or smelting of lead about one-fourth the values found fall below 1 mg. in 10 cu. meters of air, 30% between 1 and 2, 20% between 2 and 4, 10% between 4 and 5, and a few scattering values for higher concentration. The threshold concentration is 1.5 mg. or approximately half the tests showed concentrations of about this value or below.

Compare this with storage battery manufacture, where very few values below 4 mg. were found and over half were between 8 and 32 mg. and about 15% between 32 and 64 mg. This is consistant with the high incidence of lead poisoning in this industry, compared to that of lead casting and refining.

The lowest curve represents mercury vapor in the hat industry and this is somewhat similar to lead refining, with a somewhat higher proportion of values between 2-4 mg. The proposed threshold concentration for mercury is 1 mg., so there are a good many exposures above this value.

Fig. 6 gives a comparison of the two related solvents, benzol and toluol. We are frequently asked how these two compare in toxicity. There are distinctly two schools of thought on this subject. One holds that they are equally injurious, but that because of its lower vapor pressure the concentrations of toluol which exist in the air are much lower than those of benzol, and for this reason there are few cases of toluol poisoning. The other school claims that toluol lacks entirely the chronic action that makes benzol so deadly and that as long as concentrations which might cause acute poisoning are avoided, toluol will not be injurious. They point to the wide use of toluol lacquers with apparent impunity as proof of their point.

We have taken a middle course and given toluol a threshold concentration of 2½ times that of benzol, 200 ppm. vs. 75, but well below that of amyl acetate, naphtha, etc., and we have here data on the concentrations of each in typical industrial operations. The benzol data are chiefly in lacquer or dope coating processes. The toluol data include processes involving spreading, dipping, and spraying lacquers. We see that the peak of both curves comes between 75 and 150 ppm., i.e., between the threshold concentrations of benzol and toluol. There are very few toluol concentrations above 150 ppm., however, and none above 300 ppm., while 20% of the benzol values are between 150 and 300, and they run up to 500 ppm.

If these two are of equal toxicity and 75 ppm. is the threshold concentration, we would expect to find more benzol cases than toluol, but we should have a definite incidence of toluol cases. If 200 ppm. is safe for toluol, however, and these represent typical toluol exposures, we would not expect to find many cases of toluol poisoning—which is indeed the case. I think we can therefore justify our 200 ppm. value as not being too high.

I think the reason higher concentrations are not found with toluol is that this vapor, and the solvents usually accompanying it, are somewhat

irritating and distinctly disagreeable in concentrations of slightly over 100 ppm. I have made tests in many places where I thought the fume concentration was too high and found only around 100 ppm. of toluol. Such concentrations of benzol lacquers are not at all disagreeable however.

The figures I have shown must not be considered final, but they do represent the best opinions now available. In time many, perhaps the majority, will be changed, but in the meantime they constitute a very useful working standard.

The problem of how to control such hazards is not properly within the scope of this discussion. I would like to point out, however, that the design of hoods and exhaust systems is a very specialized branch of ventilation engineering, just as the determination of fumes is a specialized branch of chemistry. It is obvious that engineers for the plant or for ventilating equipment concerns can learn something from the engineers specializing in such problems. A very important part of our work involves the cooperation of our engineer with the person in direct charge of installing new ventilation or control equipment in working out the best solution of the problem.

We cannot hope to make an accurate estimate of the extent to which hazards are being eliminated, but it is becoming increasingly difficult to find gross exposures to high concentrations of fumes. For example, in 1937, 47% of our tests showed unsafe concentrations; in 1938 only 31% were unsafe. We hope to see this tendency continue.

Socialized Medicine

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In THE past two years there have appeared numerous articles about so-called social medicine, proclaiming it to be a panacea for all human ailments.* However it was not until July of last year, when the government sponsored it as one of its major aims, that it became a serious problem. Apparently the medical profession is to be used as a testing-ground for the application of socialistic doctrines on a large scale in this country. The care of little children and sympathy for the sick carry such an emotional appeal that they form an excellent smoke screen for almost any purpose, political or otherwise. Unfortunately, the medical profession, by subtle propaganda emanating from Washington, has been jockeyed into the false position of appearing to oppose for selfish reasons, legislation intended to relieve human suffering. Such accusations are absolutely untrue. The medical profession endorses every goal toward which the government aims, but it does object vigorously to some of the methods proposed for attaining those goals, believing sincerely that they will lead to disaster.

To refute the charge of selfishness in the medical profession, I ask that you simply review its record.

Four hundred years before Christ, Hippocrates, styled the father of medicine, gave a code of ethics of which we are still proud.

Down through the centuries the medical profession, numbering among its members those of almost every race, creed, and color, has accepted the responsibility of being its brother's keeper and has proved true to its trust. Never has it sought to promulgate its cause by torture and murder under the guise of holy crusades. It will match its history against that of any other, sacred or profane.

Perhaps you may say that in recent years, under the stress and strain of modern life, the profession has changed and has become selfish and mercenary. Let's examine the record further.

It is probable that some one in this audience or a member of his family is suffering from diabetes. If so, his life may be prolonged indefiinitely by the use of insulin, a drug discovered by a physician in a Canadian laboratory. Thousands of years of life and happiness have been added already, for which that physician does not receive or expect a cent of reward. It is against the ethics of the profession to capitalize on the discoveries or achievements beneficial to mankind. Had he invented some gadget indispensable to industry Dr. Banting would be a millionaire.

At the beginning of this century yellow fever was one of the most dreaded and fatal of scourges. A commission headed by Walter Reed undertook the study of this disease. In searching for the method of transmission from person to person, the mosquito was suspected to be the carrier. Two young physicians, Carroll and Lazear permitted themselves to be bitten by mosquitos which had been in contact with patients ill with the disease. Both contracted yellow fever; Carroll recovered, Lazear died. The method of transmission and the period of incubation were thus proved, and as a direct result yellow fever has been controlled and almost eliminated.

But come closer home, and drop into any of your local hospitals day or night, and you will be apt to find one or more physicians working to save some unfortunate person, knowing full well that there will be no monetary compensation. It is estimated that the medical profession in this country gives in gratuitous service one million dollars daily. What other profession can match that? Yet we are accused of being obstructionists and reactionaries for selfish reasons.

We believe not only that life, liberty and pursuit of happiness, but also that the health of the people, is the concern and responsibility of the government, and I challenge you to show me any profession or group that has worked more untiringly, year in and year out, to improve the health of the people and eradicate disease than has the medical profession. Again I emphasize that we merely oppose some of the extravagant and unsound methods advocated to attain that end, believing firmly that they will lead to disaster. It

* Read at the Forty-Second Annual Meeting of the Association of Surgeons of the Southern Railway, Washington, D. C., June, 1939.

would be a fine thing to give all persons past middle life the monthly pension advocated in California and Colorado, and make them happy in their old age. The sentiment is commendable but is it feasible?

With this brief prologue, let us take a look at just what the Administration proposed to do.

IN JULY of last year there met in Washington a group known as "The Interdepartmental Committee to coordinate health and welfare activities." It describes its own birth as follows: "The Interdepartmental Committee was appointed by the President in August, 1935, following the passage of the Social Security Act, in order that the full benefit of the varied Federal programs under the Act's provisions might reach with minimum delay and maximum effectiveness the individual men, women, and children for whose aid and service the program was brought into existence.

This committee consists of:

Miss Josephine Roche, Chairman, formerly of the Treasury Dept.

Arthur J. Altmeyer, Chairman of the Social Security Board.

Oscar L. Chapman, Asst. Sec'y. of the Interior.

Chas. V. McLaughlin, Asst. Sec'y. of Labor.

Milburn L. Wilson, Under-Sec'y. of Agriculture.

You will note that although the object of this Committee is to improve the health of the nation, there is not a single member of the medical or allied professions on it. Could you conceive of a committee of six, appointed to make drastic revisions in the methods of court procedure in the Federal and Sate courts, without having at least one lawyer on the committee?

Now what are some of the specific recommendations of this committee:

FIRST: "Preventive health services for the nation as a while are grossly insufficient."

That there could be improvement in the Federal and various State departments of health no one could deny, but to state that they are "grossly insufficient" is an exaggeration, to say the the least.

The United States is conceded to have the best health record of any country in the world with the possible exception of one which, I think, is New Zealand. I can remember the time, not very many years ago, when a large part of the practice of my father, a country physician, was the treatment of typhoid fever, malaria and, before the days of antitoxin, the dreaded and highly fatal diphtheria. Today many physicians in general practice go several years without seeing a single case of these diseases. These diseases are selected at random simply to illustrate the rapid improvement in the health of the nation in a comparatively short time. Of course there is still need for improvement in the departments of health, but is it to the extent of 200 million dollars a year, with an additional 150 million for maternal and child welfare?

SECOND: The Interdepartmental Committee states: "Hospital and other institutional facilities are inadequate in many communities, especially in rural areas, and financial support for hospital care and for professional services in hospitals is both insufficient and precarious, especially for people who cannot pay the costs for the services they need."

The Committee recommends completing in the next 10 years 500 new hospitals and thereby increasing the number of hospital beds by 360,000 for general, tubercular and mental cases. Also the construction of 500 health and diagnostic centers in areas inaccessible to hispitals. The estimated cost of construction and maintenance of these additional hospitals is 150 million dollars a year.

It was my privilege to attend the special call meeting of the House Delegates of the American Medical Association in Chicago in September, 1938, (the third call meeting in its long history of 91 years). These delegates representing 110,000 physicians went on record as favoring the general expansion of hospital facilities where need exists, but the hospital situation would indicate that there is at present greater need for the use of existing hospital facilities than for additional hospitals. The American Medical Association emphasized the fact that the stability and efficiency of many church and voluntary hospitals would be assured by the payment to them of the cost of the necessary hospitilization of the medically indigent.

THIRD: The Interdepartmental Committee states: "One third of the population including persons with or without income is receiving inadequate or no medical services."

That raises the question as to what constitutes adequate medical service, or adequate food, clothing or shelter. Be that as it may, it is well known that delay in seeking medical advice is due more frequently to ignorance or indifference rather than to the economic status of the individual. It is common knowledge that those who evade payment or who are unable to pay, utilize the services of the physician more frequently than do those who meet their obligations. The physician realizes, probably more than anyone else, that aside from the totally indigent, there is a large and deserving group in the lower income class who do not have enough to pay for clothes, food, shelter and medical services. Up to the present time the profession has carried to a great extent, these indigent and near-indigent as its contribution to a worthy cause. The burden has grown so heavy that now many of our profession are in the near-indigent class.

For the medical care of the indigent and the near-indigent the government proposes to spend 335 million dollars a year. Obviously the medical profession does not object to the government paying for the medical care of those who previously have paid nothing. That is the argument the government is using. But there is a fly in the ointment. In the countries where that is done a large share, reaching as high as 50% or more, goes for administrative purposes or into

other channels rather than for the actual care of the needy. Did I hear someone remark "It can't happen here." Mr. Lawrence Sullivan, in the November *Atlantic Monthly* says: "As of July 1 this year the United States Civil Service Commission reported 25,815 full-time employes in the *administrative* service of the Works Progress Administration, which is about equal to the total number of employees in the departments of State, Labor, and the government printing office, combined. In addition the States and cities maintain a combined administrative personnel in public assistance numbering 9600 full-time salaried employees."

If the experiences of various other countries are any criteria, the quality of medical services delivered to these indigent and near-indigent, will be far inferior to what they now receive. No physician, however skilled, conscientious, or able bodied, can grind out good medical service under what we believe and fear will be the restrictions imposed. A suspected cancer in the alimentary tract cannot be put in the same category as defective plumbing; and surely even a faint murmur in your heart means more to you than a loud knock in the engine of your car. There is more to the practice of medicine than pills and the scalpel. When you have destroyed by mass production that intimate and confidential relationship between patient and doctor, we can no longer claim to be members of an ancient and honorable profession, but simply artisans.

FOURTH: The Interdepartmental Committee states: "An even larger fraction of the population suffers from economic burdens created by illness." I am inclined to believe that the converse is more nearly correct, that a larger fraction of the population suffers from illness because of the results of unemployment, than the number having jobs but not working because of illness. Suppose you had the power of a fairy godmother and by waving a wand you could eradicate disabling illness from all wage earners adding them to the present supply of workers, but without being able to increase the number of jobs. Or, as alternative, you could wave the wand in the opposite direction and create jobs for every able-bodied wage earner in the country. I believe most of you will agree that the latter by raising the standard of living, largely eliminating under-nutrition, changing the outlook from despair to hope, would do infinitely more for the health of these people, than any amount of medical services.

In short, there are a hundred times more able bodied men and women unemployed because there is no work, than there are disabled persons with jobs awaiting them. It is an economic rather than a medical problem. When men and women can get steady employment with proper food and reasonable economic security, the mirage of socialized medicine will largely disappear.

WITH a huge and rapidly increasing deficit are we justified in spending nearly a billion dollars a year on another "Noble Experiment?" If, perchance, this huge expenditure together with the powerful political backing of the Administration should give to regimented, government-controlled medicine a semblance of success, the socialization of other professions will follow as surely and as speedily as Czecho-Slovakia followed Austria.

I will conclude with an editorial from the *Washington Evening Star* of last July 26: "The United States goverment already is deep in the field of medicine. The nation's hospitals for veterans, its medical services for the Army and Navy, its National Institute of Health, with one of the most efficient medical research laboratories in the world, the far-flung activities of the Public Health Service, of the Children's Bureau, of the Department of Agriculture constitute an impressive set-up, rivaled by no other country. We have gone far to protect the health of the citizens. But in the past the actual practice of medicine, the relations between the individual physician and the individual patient, has not been considered a government function, with the quite limited exception of the care of persons entitled to be considered government wards. It may be that all this is to be changed. There can hardly be any question, after the National Conference held here this week, that there is an increasingly great public sentiment for Federal services in various directions.

"The needs, it is obvious, are great. Indeed, they are so great that many people are impatient, unwilling to recognize the complexities of the problem, impatient of the traditions of the medical profession which have endured through the ages by passing through the filter of the survival of the fittest.

"They are too often likely to look upon medical services as something that can be bought and sold like shoes or potatoes. If folks are shoeless or hungry the government may, and usually does to some degree, supply the wants. If folks are sick and unable to buy private medicine, why, it is asked, should not the government give them public medicine? The problems of keeping people well are not quite so simple as the problems of feeding them or clothing them, however complex these may become at times. They are difficult because there is no way to supply in wholesale quantities the most essential thing in medicine, the relations between one individual and another. These cannot be bought in carload lots to meet emergencies. They cannot be stored in elevators like wheat or corn. Whatever program is adopted must be formulated with this in mind. Otherwise it is bound to be indifferently beneficial to the people. The physician must remain 'master in the house of medicine.' He must be kept free from political control. Any set-up which has not his complete approval and sincere cooperation hardly can hope to succeed. A larger government activity in the field of medicine should come gradually, with much testing and proving, through the expansion of the functions which already exist."

Books

Review by
FREDERICK W. SLOBE, M.D., F.A.C.S.,
Chicago

INJECTION TREATMENT OF VARICOSE VEINS AND HEMORRHOIDS. By H. O. MCPHEETERS, M.D., F.A.C.S., and JAMES KERR ANDERSON, M.D., F.A.C.S. Published by F. A. Davis Company, Philadelphia.

THE major portion of this book is by McPheeters and is devoted to the subject of varicose veins.

The author lists Berntsen's classification based on pathological conditions present but also a classification of his own based on the size of the vein, which he feels is advisable because of the variation in treatment depending on size and location. In discussing embryology, the work of Kampmeier and Birch is reviewed.

Concerning etiology various factors are discussed: (1) Delbet's mechanical explanation that back pressure from above causes the upper saphenous valves to give way; (2) the gradual degeneration of valves during life; (3) the element of infection; (4) endocrine factors; (5) and the hereditary relationship.

A convenient table lists the distinctive points differentiating varicose veins from other conditions. The various tests of Trendelenburg, the Perthes modification, and similar tests are adequately described. The vicious circle effect of the venous overflow through deficient valves is stressed. By viewing with the fluoroscope veins injected with lipiodol, the author has very definitely proved that the venous flow of varicose veins is toward the periphery, either such reverse flow or blood stagnation being present in varicose veins.

In the section on varicose ulcer the accepted etiology is a trophoneurotic disturbance, stagnation of the fluid in the tissue lowering the local resistence so that a trivial trauma or an infection (either local or focal in origin) have far-reaching results. The specific type of infection does not seem to be an important factor. The fundamental cause, of course, is the presence of pre-existing varicose veins.

As to treatment, after briefly discussing palliative and operative measures, a thorough discussion of the injection method is given together with a historical sketch dating from Chassaignac in 1853 up to the present time. The solutions preferred by the author are sodium morrhuate and its allied preparations such as sodium monoleate, sodium linsoleate, sodium ricinoleate, and sodium morrhuate with quinine. The author feels that positive indications for injection are any varices which by size or painfulness partially disable the patient or which have caused the development of ulcer, eczema, or pruritis; pregnancy is no contra-indication if any of the above are present; varices present in patients exhibiting cardiovascular or cardiorenal diseases are border line; cosmetic indications exist in certain instances; and age in itself is no contra-indication. Destruction of the deep veins by a previous infectious thrombophlebitis is, of course, a contra-indication provided the deep veins have remained permanently blocked.

The author's technic is given adequately by word and illustration; the associated high ligation of the saphenous is favored in selected cases. The need for follow-up treatment with subsequent injections is stressed both because of recurrence and partly because of the development of new varices.

The author emphasizes the distinction between the chemical thrombophlebitis induced by injections and acute infectious thrombophlebitis; detached embolism occurs in the former with the greatest rarity whereas they occur quite frequently in the latter. Peri-vascular injections of the stronger solutions may cause a slough which is extremely slow to heal if left alone but if an early complete excision and closure is made healing is often expedited. Pigmentation and hypertrichosis are occasional annoying sequelae from a cosmetic standpoint. A typical lymphatic edema occurs occasionally also.

After injection, varicose veins are occluded by thrombus and clot, chiefly the latter. Due to the injury to the intima the thrombus is firmly attached. Clefts formed by clot retraction apparently form the basis for subsequent recurrence. In enlarged veins it may take from two to three months before the entire clot is completely organized, although there is a great variation between the rate of organization in the different veins.

The frequency of pulmonary embolism following the injection treatment is given as .00754% as compared with .53% following the operative treatment; the rarity of embolism following injections is due ot the adherence if the thrombus and the direction of the venous flow in varicose veins away from the heart. The author does not consider sclerosing phlebitis as a complication feeling that the greater the extent of the involved veins that can be treated at one sitting the less liklihood there will be of an acute infectious thrombophlebitis as this, of course, may develop in untreated segments. The author feels also that septicemia and slough are due to errors in technic.

Statistics as to recurrence are reported from various clinics, most of them ranging from 4 to 10% although one series is reported as high as 79%. The distinction between an actual recurrence and the development of new varicose veins is emphasized.

The author agrees with Aschoff's explanation as to the three essential criteria for successful effect of the injected chemical: (1) stagnation of the blood stream; (2) destructive action on the vein wall; and (3) reaction on the blood content. Many failures are due to ignoring the importance of sclerosing the great saphenous vein, the author emphasizing his percussion pulse test.

In treating varicose ulcers the author prefers sponge rubber pressure with an elastic bandage, the muscular contraction of the ambulatory patient forcing the excess fluid from the tissues. Careful and complete sclerosing of all the offending veins is done; in some cases skin grafts will very materially shorten the healing period. Unna's cast or the rubber stocking are valuable.

A comprehensive bibliography of 193 references is listed, and there are 67 illustrations and 228 pages are devoted to the subject.

The section on the injection treatment of hemorrhoids by Anderson contains 13 illustrations and 70 pages. Because of the greater difficulty in technic as compared to varicose veins this subject has stimulated much less general interest than the latter. It merits very definite recognition, however, and in due time its popularity will surely be enhanced. The author states that 50% can be cured by injection plus minor office surgery, with 25% by injection thus leaving 25% for surgery alone. External and anal hemorrhoids, of course, should never be injected with sclerosing fluids. The method requires skill and experience and should not be applied indiscriminately.

The embryology and anatomy of the vascular supply is discussed. The author admits that because of free anastomosis the hope of destroying the blood supply of a hemorrhoid by a single injection is rarely possible.

An important point is that no sclerosing fluid should ever be used distal to the anal-rectal line. The essential principle in the injection of a hemorrhoid is that a perivascular inflammation occurs followed by a sclerosis and obliteration of the vessels. The author prefers 5% phenol in olive oil or almond oil, great care being exercised to avoid introduction of the solution directly into the vein. In the average case two different quadrants are injected at one sitting but only one subsequently if too much reaction occurs. The average case will require from 15 to 20 treatments, insufficient treatments being the commonest cause of failure.

The chief advantages of the method, of course, are freedom from loss of time from work, quick relief, permanent results when correctly managed, and its applicability to poor surgical risks. The disadvantages are the six to 12 weeks time required, occasional disagreeable complications, and certain recurrences when the treatments are not completely carried out. Complications (usually due to

improper technic and poor selection of cases) are the development of slough, bleeding, undue reaction, and drug idiosyncrasies. The presence of any complication constitutes a contra-indication to the method: hemorrhoids should not be injected in the presence of fissure, fistulae, cryptitis, proctitis, condylomata, severe pruritis, ulcer, anal strictures, and ulcerative colitis. Prolapsed internal hemorrhoids should not be treated unless replaceable and kept in position.

The essential elements of both subjects are given in sufficient detail so that the physician may glean much valuable information concerning a subject which is destined to become more and more important as physicians realize more fully the possibilities of the injection method.

The Periodic Examination

—II. *A Group Study in Prognosis*—

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A RECENT survey of the periodic physical examination concerned itself with the diagnostic accuracy of a group of physicians devoting part of their time to an industrial clinic of a large department store.* The material consisted of 500 unselected cases past the age of 50 years, on whom 1493 examinations had been performed. On the basis of comparison of the stated findings in the records with subsequent final diagnoses from death certificates in the cases of the 80 who died it appeared that approximately 70% of the diagnoses were correct.

Another aspect of the problem which also offered at the time a favorable basis for evaluation was the "work-prognosis." At the conclusion of each examination the physician answers the question of whether the present occupation is suitable to the individual. This presupposes a general acquaintance with the physicial demands of the various occupations considered. Only basic recommendations predicated on major physical disabilities are considered in this survey, such, in other words, as may be stated simply as "physically fit" or "not fit" for continuance of work or, pending further studies, "held in question." Temporary leaves, changes of occupation, of hours, of hygienic routine, and similar recommendations do not come in for analysis here. The examination itself, it may be said, follows the usually accepted clinic form of history and procedure, including the simpler laboratory and Roentgen studies. The question, then, was: To what extent would the prognosis of this group of average physicians as to the ability or disability of the examined employee to continue at work, be corroborated by subsequent history?

There were in this unselected number 344 men and 156 women, ranging in age from 50 to 87 years and with terms of employment of from four to 62 years. The distribution of occupations follows:

	Men	Women	Total
Selling	46	63	109
Non-selling	298	93	391

The heavier occupations, such as loaders, porters, cleaners, maintenance men, are included in the non-selling classifiication. There were of these 93 men and 23 women.

In the entire group the answers to the leading question showed that:

427 were considered fit to continue at work;
49 were considered not fit;
24 were under question.

In the following are seen the physical findings and the subsequent course of the 49 employees who were advised to discontinue work:

DIED (20)

Abdominal mass.
Arteriosclerosis, chr. myocarditis.
Arteriosclerosis, chr. myocarditis, pulmonary disease.
Arteriosclerosis, gastric resection.
Arteriosclerosis, hypertension, carcinoma of larynx, varicose veins.
Arteriosclerosis, hypertension, chr. myocarditis (3).
Arteriosclerosis, hypertension, nephritis.
Carcinoma (gastric), hernia.
Cardio-vascular-renal disease (2).
Hypertension, anemia, hematuria.
Hypertension, angina pectoris (2).
Hypertension, emphysema.
Hypertensive heart disease (2).
Malnutrition, hyptertension, myocarditis (?)
Pulmonary tuberculosis.

RETIRED (19)

Arteriosclerosis, angina, hernia.
Arthritis.
Arthritis, obesity.
Cerebral hemorrhage.
Chr. cardio-valvular disease.
Chr. cardio-valvular disease, arthritis.
Chr. myocarditis.
Chr. myocarditis, hypertension.
Chr. myocarditis, obesity.
Chr. myocarditis, fibroid, edema.
Diabetes, peripheral neuritis.
Hypertension (2).
Hypertension, obesity.
Hypertension, arteriosclerosis, arthritis.
Hypertension, arteriosclerosis, scoliosis.
Hypertension, C.C.V.D., nephritis.
Pneumonia (recent).
Pulmonary tuberculosis.

ACTIVE (10)

Arteriosclerosis, senility.
Hypertension, chr. myocarditis, angina.
Hypertension, chr. myocarditis, arteriosclerosis (?)
Hypertension, chr. myocarditis, arteriosclerosis, hernia.
Hypertension, arteriosclerosis.
Hypertension, arteriosclerosis, anemia.
Hypertensive heart disease, varicose ulcer.
Hypotension. chr. myocarditis.
Herniae.
Nervousness (functional).

Of the 20 who died only three survived more than a year. Nineteen retired on advice for health reasons in most instances. Ten continued to be active chiefly as a result of a change to lighter occupation. In this connection it need only be mentioned that economic conditions undoubtedly influenced the physicians in postponing recommendations of retirement, as well as compelled the employee to continue work as long as possible.

The group of 24 under question included those on whom further studies were pending or who were recommended for lighter work or retirement in the near future. The following shows the physical findings and later course of these:

* From the Medical Department, Macy Mutual Aid Association.

DIED (7)

Anemia.
Hypertensive heart disease.
Hypertensive, myocarditis, nephritis.
Hypertension.
Hypertension, aortitis.
Hypertension, obesity.
Nephrolithiasis.

RETIRED (6)

Arteriosclerosis.
Hypertension (2).
Hypertension, myocarditis, herniae.
Hypertension, varicose veins.
Pernicious anemia.

ACTIVE (11)

Arthrits.
Gastrectomy.
Hypertension, chr. myocarditis.
Hypertension, nephritis, hernia, hearing defect.
Hypertension, obesity, diabetes.
Hyptertension, underweight.
Hypertension, visual defect.
Herniae.
Herniae, chr. myocarditis.
Herniae (potential).
Obesity, nervousness (functional).

In group I (physically not fit to continue) more individuals died or resigned and fewer, accordingly, remained active than in group II (under question):

	Group I	Group II	Total
Died	41%	29%	37%
Retired	39%	25%	34%
Active	20%	46%	29%

Considering now the subsequent course of the 427 individuals who were pronounced fit to work, it was found that 54 died, 20 from acute or sudden conditions, such as, pneumonia, suicide, etc. The examination findings in the remaining 34 as compared with the final diagnoses are shown in the following:

Examination Findings	Final Diagnosis
Abdominal mass (undiag.).	Ca. head of pancreas.
Anemia, secondary.	Acute lymphatic leukemia.
Arteriosclerosis, emphysema, myocarditis (?).	Coronary thrombosis.
Arteriosclerosis, general.	Chr. myocarditis.
Cardiac, potential.	Chr. cholecystitis, post-oper. bronchopneumonia.
Chr. myocarditis.	Gen. arterioscl., myocarditis.
Chr. myocarditis, arteriosclerosis.	Coronary thrombosis.
Chr. nephritis, hypertension.	Cerebral hemorrhage.
Chr. nephritis, hypertension.	Cerebral hemorrhage.
Hypertension.	Laryngo-pulmonary tuberculosis.
Hypertension.	Cerebral thrombosis, myocardial failure.
Hypertension.	Cerebral hemorrhage.
Hypertension.	Carcinoma of breast (post-oper.).
Hypertension.	Coronary sclerosis.
Hypertension.	Cerebral hemorrhage.
Hypertension.	Uremia.
Hypertension.	Cerebral hemorrhage.
Hypertension, arteriosclerosis, chr. nephritis.	Hyptertension, chr. nephritis.
Hypertensive heart disease.	Cardiac failure.
Myocarditis.	Chr. myocarditis.
Obesity, hypertension, nephritis (?).	Coronary disease.
Obesity, myocarditis.	Chr. myocarditis.
Obesity.	Metastatic mammary carcinoma.
Tachycardia, tremor.	Thyroidectomy, chr. myocarditis.
Tongue resection.	Carcinoma of tongue.
Ulcus, gastric.	Gastric resection, pneumonia (post-oper.).
Undiagnosed, gastric.	Gastric carcinoma, myocarditis.
Without findings.	Chr. nephritis, lung abscess.
Without findings.	Chr. alcoholism, myocarditis.
Without findings.	Metastatic breast carcinoma.
Without findings.	Carcinoma esophagus, chr. myoc.
Without findings.	Carcinoma of stomach, myocarditis.
Without findings.	Carcinoma of colon, chr. myoc., arteriosclerosis.
Without findings.	Chr. myocarditis.

As will be seen from the above there were 15 missed diagnoses.This was considered in a previous study which concerned itself with the general subject of diagnosis in industrial periodic examinations. The prevalence of cardiovascular-renal disease in 17 of the remaining 19 cases should be stressed, as it is in that system-complex that our prognostic acumen will continue to be tested.

The time interval between the last physical examination and death in the above group was:

Less than a year	6 patients
one year	13 patients
two years	8 patients
three years	5 patients
four years	2 patients

Another viewpoint of the problem of prognosis is presented by the group that retired from activity. This included 56 workers, 19 of whom were considered physically unfit for continued occupation and six questionably so.

The major physical findings in this group with the stated work-prognosis are seen as follows:

MAJOR PHYSICAL FINDINGS IN FORMER EMPLOYEES AND THE WORK-PROGNOSIS

	"Yes"	"No"	"Doubtful"
Anemia, pernicious			1
Arthritis	2	3	
Bronchiectasis	1		
Cardiovascular-renal disease	15	14	5
Chr. osteomyelitis	1		
Herniae	2		
Malnutrition	1		
Nervousness (functional)	2		
Pneumonia (recent)		1	
Tuberculosis (minimal)	1	1	
Without findings	6		
	31	19	6

In a third of the number who were considered fit to continue a recommendation for lighter or sedentary work or for retirement in the near future was made. During the years of economic stress covered by this survey cessation of work was a serious consideration and the tendency on the part of the examiner admittedly was to allow the employee to continue, when no immediate contra-indication was evident. It is noteworthy that in the largest group here, the cardio-vascular-renal, the number receiving a "no" or a "questionable" prognosis was over 50%.

To some extent we were enabled to follow the later course of some of these former employees through the social and visiting services. Of the 25 whose prognosis for further work was unfavorable 16 were found to be living and seven dead. It was not possible to locate two of the group. The time interval between cessation of employment and the follow-up varied from one to nine years.

The predominating disability was in the cardio-vascular-renal systems. Other pathological states recorded included pulmonary tuberculosis, arthritis, and pernicious anemia. Only one of those surviving found to have returned to active occupation. Among the reasons for the resignation of the remaining 31 employees who at their last periodic examination were pronounced physically fit to continue, were the age factor per se, the increasing demands of the work, the expected pension, various personal considerations, etc. In only a very few instances was the state of health given as a reason, although this would appear to be the most plausible and acceptable under the circumstances.

In viewing the various phases of the problem involved in the physician's work-prognosis the factor of age presents itself. It was found that the average age of all the employees who were considered fit to continue at their various employments was 57.2 years, whereas that of the declared unfit and questionable was 62 and 61.4 years respectively. A further analysis of the ages according to the subsequent history of these two groups showed the following:

AVERAGE AGES OF EMPLOYEES DECLARED UNFIT TO WORK, ACCORDING TO THE SUBSEQUENT COURSE

Those who died	63.2 years
Those who retired	65.7 years
Those who remained active	63.5 years

AVERAGE AGES OF EMPLOYEES OF QUESTIONABLE PHYSICAL STATUS, ACCORDING TO THE SUBSEQUENT COURSE

Those who died	64 years
Those who retired	65 years
Those who remained active	55.2 years

With the exception, then, of the younger age level of those whose prognosis was questionable and who remained active, age, as such, would not appear to be a factor in basing a prognosis.

The duration of employment is of interest. The average employment span of those who were considered fit to work was 18.9 years; of those considered unfit 22.3 years and of the questionable group 22.8 years. As might have been expected, those who were fit to work were, on the whole, younger and of shorter employment age than those in whom physical disabilities were found.

What relation, if any, did the nature of the work and its degree of severity bear to the prognosis? This is shown in the following:

TYPE OF WORK IN EMPLOYEES WITH AN UNFAVORABLE WORK-PROGNOSIS

	Sales	Non-sales	
Men	6	31	(heavy work in all but 6—80%)
Women	4	8	(all heavy work)

TYPE OF WORK IN EMPLOYEES WITH A QUESTIONABLE WORK-PROGNOSIS

	Sales	Non-sales	
Men	1	13	(heavy work in all but 1—92%)
Women	4	6	(heavy work in all but 2)

Since the ratio of sales to non-sales in the entire study group is approximately 4.1, the relationship as seen above in this respect also appears to have the same proportion. Stated in other words, the type of occupation, grossly divided into selling and non-selling, did not seem to be a factor in the work-prognosis. However, the predominance of the heavier types of occupation for both sexes in the non-selling group should be emphasized. In the non-selling groups with a favorable prognosis the percentage of heavier occupations was comparatively lower, 62% among the women and 80% among the men.

The prevalence of cardiovascular-renal pathology was previously noted. Of the 49 who were considered not fit to continue at work 39 had some form of abnormality referable to these systems (79.6%). This compares with 127 out of 291 who were considered fit and remained active (43.6%) and five out of 11 with a questionable prognosis (45.5%).

A further examination of the data with relation to age and cardiovascular-renal pathology is summarized in the following:

AVERAGE AGE OF EMPLOYEES WITH CARDIO-VASCULAR-RENAL PATHOLOGY IN RELATION TO THE SUBSEQUENT COURSE

	Women	Men
Died	56.2 years	62.4 years
Active	57.1 years	60.6 years
Resigned	59.3 years	65.6 years

Since the average of the ages of all men in the study was 58.6 years and of all the women 56.5 years the conclusion may be drawn that from the standpoint of the work-prognosis men with this form of pathology are generally in a somewhat more favorable position than women. The incidence of cardiovascular-renal pathology in the entire group was 46% (230 employees). This may be considered rather high even though the average age of the group was over 55 years. It should be noted that the most important sole finding was of hypertension (52.3%). Although the minimal level was set at 150 mm. systolic the pres-

ence of essential or purely functional cases must be considered, even though not estimable here.

Discussion

THE work-prognosis made by the physician at the conclusion of the periodic examination may then be evaluated, as shown by the preceding, in several ways.

First, from the unfavorable standpoint — there were 49 of the entire number who were not considered physically fit to continue work; 20 of these died (all but three within a year), 19 retired, and 10 continued active, due, in most instances, to a lightened schedule; 24 others were under question as to whether or not to continue occupation, pending further studies and a limited test of time; of this number seven died, six retired, and 11 remained active.

Second, to what extent was the prognosis faulty in those who were considered physically fit to continue at their work? Of this number (427) 54 died, 20 from acute or sudden causes, such as pneumonia or suicide, and more than two-thirds of the remainder from conditions related to previous diagnoses but apparently not considered imminent enough for retirement. Not quite comparable to these as an index yet offering a valuable viewpoint is the group of employees who retired from active occupation. There was a total of 56 and, as previously stated, diverse circumstances—age, stress of work, prospect of pension, etc.—contributed to their change of status. It is notable that almost half (25) of these were considered either not physically fit or were under question. A later follow-up of these showed seven dead and 16 living, only one of whom had returned to active occupation.

An analysis of the age factor in work-prognosis showed that, while the average for those considered fit to work ranged about 4½ years less than for those declared unfit or under question, as far as the later course was considered, age, as such, was not significant in basing the prognosis. The one exception was the generally younger age level of those with a questionable status who remained active.

An average difference of employment span of about 3½ years was found between those with a favorable prognosis and those with an unfavorable one in general. While the nature of the work, grossly considered as selling and non-selling, did not appear to be a factor, the prevalence of the heavier types of occupation for both sexes with unfavorable and questionable prognoses was marked.

The diagnosis most frequently made in the entire group was of one or more types of cardiovascular-renal pathology (50%).

This in the order of frequency was found as follows:

In those declared unfit to continue (79.6%), those who died (65%), those of questioned status (45.4%), those considered fit and who remained active (43.6%). From the standpoint both of longevity and of continued activity men with this form of pathology appeared to be more favored than women. If the incidence of cardiovascular-renal pathology in this group appear rather high, it should be remembered that it included a large percentage of cases with hypertension as the only finding (52.3%). Since the minimum level of this was set at 150 mm. systolic and the average age incidence of the group was over 55 years, their inclusion here would appear warranted, even though a considerable proportion was probably of the essential type.

On the basis of a periodic physical examination, including the simpler laboratory and roentgen procedures, the regular physician in industry, acquainted to some extent with the nature of the individual employee's work, is capable of rendering a work-prognosis which is correct in the great majority of cases.

American Conference

—Industrial Medicine and Hygiene—

THE American Association of Industrial Physicians and Surgeons and the American Industrial Hygiene Association will hold their 1940 Conference at Hotel Pennsylvania, New York City, on Tuesday, Wednesday, Thursday and Friday, June 4, 5, 6, and 7, 1940.

The Conference will mark the Twenty-Fifth Annual Meeting of the A. A. I. P. & S. The meeting of the Hygiene Association will be the First Annual, as the organization took form at the 1939 Conference at Cleveland.

The development of Programs of superlative interest has already been begun by both Associations.

Exhibits, as before, will be a feature of the Conference; details in that connection to be handled by A. G. Park, Convention Manager, and Executive Secretary of American Association of Industrial Physicians and Surgeons. Mr. Park's office is at the A. A. I. P. & S. headquarters, 540 North Michigan Ave., Chicago.

The Editor!

THE following is attributed to the Albia, Iowa, *Union-Republican:*

"A good editor is one who has never made a mistake; who never has offended any one; who is always right; who can ride two horses at the same time he is straddling a fence with both ears to the ground; who always says the right thing at the right time; who always picks the right horse as well as the right politician to win; who never has to apologize; who has no enemies; and who has worlds of prestige with all classes, creeds and races.

"There has never been a good editor."

Industrial Medicine

Reg. U. S. Pat. Off.

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VOLUME 8 OCTOBER, 1939 NUMBER 10

"Doctor in the House"

TEN years ago a man of our acquaintance, deeply interested in industrial relations, wrote as follows:*

"Other things being equal, sales contacts and service contacts being on a par, there is yet—over and above the questions of quality, price and delivery, beyond and behind the satisfactory meetings of minds on purchase and sale—the subtle attitude, the intangible atmosphere, that reacts to create the public preference for one concern over another which is tangibly expressed in a preference for its products. This is public goodwill. And it is a phenomenon of public goodwill that the highest point to which it can be developed by products is far below the higher point to which it will climb when the public becomes aware of the employer's real efforts to improve the conditions from which the products come."

The implications, developed in the context, urged upon emloyers whose industrial relations policies involved more than the mere wage relation the advisability of talking about what they were doing. The public reactions to employer efforts of every kind intended to humanize the circumstances of employment and make them more agreeable could not fail to be preponderantly favorable. Such efforts, therefore, should be made known, publicized, even advertised. Standard Oil of Indiana had made a beginning; a current newspaper presentation of its Red Crown mentioned specifically "the industrial relations plan, the death benefits, the annuity plan, and the employees' stock purchasing plans."

The response to this suggestion, however, was that the aforesaid author was "ten years ahead of his time." Be that as it may, he still believes what he said, and now observes the event overtaking the prediction.

The New York Times of Sunday, September 10, 1939, carried the almost-full-page ad of L. BAMBERGER & Co., of Newark, New Jersey, "One of America's Great Stores." A huge picture of the pillared ground floor dominated the page, and underneath was the caption: "Is there a Doctor in the House?" And beside the caption was:

WE LIVE IN A BIG HOUSE . . . one of the biggest in New Jersey. It covers an entire square block. We need a big house because we're a big family. Not counting the in-laws, there are more than 4000 of us. FOR A BIG FAMILY we keep mighty healthy. Part of the business of running a big house is keeping the family healthy. Perhaps the most important part. Sometimes one of us catches a cold, or gets an earache, or stubs a toe. But we snap right out of it. We believe 'an ounce of prevention is worth a pound of cure.' So we keep a doctor in the house. DOCTOR? We've a whole health department full of 'em . . . one of the few health departments in New Jersey accredited by the American College of Surgeons. MAYBE WE'RE HEALTHY because we live in New Jersey . . . one of the four states having the highest health rating in the nation . . . the lowest infant mortality . . . the oldest medical society. BUT WE THINK it's mainly our health department which has kept more than 1000 of us fit for over 10 years . . . more than 400 over 20 years . . . and which has enabled one of the youngest of us in spirit to sell hats to the women of New Jersey for nearly half a century."

THE radio resounds with the claims of foods, etc., that they have the approval of organized medicine. It is a sales argument, but foods without it seem to be holding their own in customer appeal — probably because not very many people would be directly affected one way or another if there were no such approval. But a very great many people *are* affected, in ways deep twined in the fabric of their lives, when medical service of the quality approved by the AMERICAN COLLEGE OF SURGEONS looks after their *health* in the places of their employment. The A.C.S. approval is as vital as modern machinery, as potent as an education in economics, as much a matter of pride as a new building or a profitable year. It is reflected in everything that is made or sold under the maintenance of its standards. Congratulations to Bamberger & Co.! Their A.C.S. Certificate may hang in the Medical Director's office — we know of some others that overlook the President's desk—but the *fact* of it and all that it means are now woven into every commodity that crosses their counters!

INDUSTRIAL HEALTH AND DISEASE

Dermatitis and Other Industrial Hazards Prevention

HOWARD E. COLLIER, M.D.

THE prevention of industrial dermatitis consists in the application of certain simple general principles to the particular circumstances of each case.* These principles can be conveniently considered under the following headings:

1. Control of the primary risk.
2. Control of the secondary risk.
3. Preventive hygiene of the worker.

Of the three groups, (1) and (2) are essentially the responsibility of the industrial management, while (3) depends as much upon the cooperation of the worker as it does upon the initiative of management.

(1) *The control of the primary agent*

Primary agents act either as (1) dusts or fumes conveyed to the skin in the air, or (2) as liquids or solids that are brought into direct contact with the workers' skin during his work. Essentially, therefore, the prevention of dermatitis is either a problem of reducing the concentration of toxins in the air, or of diminishing the actual degree and duration of contact between the toxic substance and the worker's skin.

Under the first heading, consideration should be given to the following point: (*a*) Can a non-toxic substitute be found for the substance actually being used? (*b*) Can the dust or fumes be controlled or reduced at or very close to the source of its production by the use of fans or other means? (*c*) Can contact of the specific agent with the workers' skin be reduced by means of protective clothing, altered methods of handling the goods, elimination of "dirty" jobs, or by devising new and cleaner methods of handling the goods? For example, the handles of paint brushes and sprays may be properly guarded and proper racks may be devised for brushes and tools to prevent paint from soiling the brush handles, etc., or methods of "cleaning off" may be changed, or mechanical handling may be substituted for manual methods, etc. In many cases a combination of these methods will produce remarkable results. In any case, we may be sure that if the dermatitis is produced by the direct contact between the specific factor and the workers' skin, if that contact is prevented, no dermatitis will occur. It should be remarked, however, that the indiscriminate use of rubber gloves may cause almost as much trouble as it relieves. Impervious rubber gloves have the same effect on the skin as immersion in warm water has: they render the skin soft and sodden and are liable to cause skin trouble on their own account.

The secondary factors should then be dealt with on the same lines. The temperature and humidity of the shop as a whole and the temperature and humidity *of any particular area in the shop* should be carefully considered. In certain industries, it may be advisable to cease production on processes involving a dermatitis risk, during the hotter parts of the day, during very hot weather, and especially if the atmosphere is humid. Consideration should also be given to the possibility of reducing friction on the skin. In any occupation of risk, dermatitis is liable to occur on those parts of the body that are subject to friction either from work or from clothing: gloves, guards and gauntlets may help to reduce the former kind of friction; clean loosely-fitting clothing that does not rub the skin of the neck or wrists during work will help to reduce the latter. Caution should be exercised in instituting overtime. A shift system may be a better plan.

Many years of experience have convinced the writer that *trivial injury*, and especially injury complicated by sepsis, is probably the most important single factor in determining the onset and still more in determining the *severity* of dermatitis. If there is a dermatitis-risk in a factory, an adequate nursing service is of the utmost importance. Every rash and every trivial illness *must* be reported and *must* receive intelligent and expert care, otherwise sepsis implanted upon a previously "irritated skin" is likely to turn into a septic eczema which may take months and months to cure. The regular (weekly) examination of the hands of workers engaged upon an "occupation of risk" by a nurse or doctor is an all-important routine preventive measure, which is only second in importance to the proper *treatment* of trivial injuries, including the most superficial burns.

This brings us to a consideration of the personal aspects of prevention. These may be considered under the following heads:

1. Selection of the workers.
2. General health of the workers.
3. The skin hygiene of the workers.

Properly speaking, the selection of the workers for an "occupation of risk" is a medical procedure; but it may be said that as a general rule a "blond," fair-haired, red-skinned individual is more likely (for constitutional reasons) to contract dermatitis than his darker, pale or brown-skinned fellow. Fair-skinned people usually "feel the heat" and their skins are unduly sensitive to irritants. This is especially true of those who have previously suffered from eczema, etc.

But not all dark-skinned people possess resistant skins. There is a group (well-recognized by doctors) of dark-skinned individuals whose skins are unhealthy. These people are the dry-skinned or the moist-skinned "seborrhoeics." They often show a history of asthma, eczema, hay fever; they suffer from chapping or cracking of the skin and dandruff, etc. It is our opinion that much can be done to prevent dermatitis (and especially the most severely-disabling cases) by proper selection, but we should not wish it to be supposed that it is always possible to eliminate the sensitives.

After all, the reaction of the skin of anyone to an irritant is a matter of degree. Strong alkali will destroy every skin, less strong alkali will damage a certain proportion of skins, and a few persons will suffer from dermatitis whenever their skins are brought into contact with the mildest alkaline solution.

The role of ill-health, and especially of "focal sepsis" is primarily a medical matter. If he can avoid it the wise manager will not employ persons who "look unhealthy" in an occupation involving a risk of dermatitis.

EVERY worker has a right to know what risks (if any) are involved in his work and how those risks may be avoided. It is objected sometimes that it is unwise to be constantly reminding workers of the risks that they run. This view is an unsound one. The dangers of industry arise from ignorance, rather than from knowledge. Workers should therefore be trained in dermatitis prevention just as they are trained in accident prevention. They should be told that in many industries one attack of dermatitis renders them more susceptible to a second, and that after two attacks a condition of hypersensitiveness may develop that will exclude them from their means of earning their living. It should be made clear to them that prevention is relatively easy and that cure may be very difficult, that even the slightest rashes should be reported at once and slight injuries properly attended to: each worker should be *educated* from the first day of employment to work in such a manner as will prevent the "irritant material" from coming into contact with his skin.

* In *Labour Management*, London, July, 1939.

Wherever "irritant dust" or fume of any kind is present, friction from clothing, tight hats, collars, cuffs, greatly increases the risk of skin trouble both by rubbing the dust into the skin and by increasing sweating. The same applies to hot shops. Oil-soaked, dirty clothing should be avoided.

Finally the worker should be provided with the means of attending to the hygiene of his skin and instructed in the proper methods of skin hygiene.

APART from the provision and careful supervision of gloves, protective clothing, etc., for workers exposed to skin hazards, there is a "routine" of skin care which should be adhered to in every case.

THE TOILET OF THE SKIN

(A) *Before work:* (1) Wash face, neck, arms and hands carefully with a good soap in warm and, if possible, soft water. Hard scrubbing brushes should be studiously avoided; they are liable to injure the skin and nail-beds.

(2) Dry the skin carefully, using individual towels or an air-drying machine.

(3) Apply a thin layer of "protective substance" to the skin before commencing work.

(B) *At the conclusion of any work spell* — if the hands and arms are grimed or soiled with dirt that cannot easily be removed, wash the parts with cotton seed oil or with some solvent material that at one and the same time is as efficient as possible and as non-irritant as possible. The choice of the cleanser depends upon the material to be removed from the skin. The indiscriminate use of benzol, crude paraffin or potent industrial solvents is greatly to be deprecated. Many cases of industrial dermatitis are caused almost entirely by the materials used to clean the hands after work. If solvents must be used, the smallest possible amount should be used, and it should be used as infrequently as practicable. In some instances (provided there is no technical objection to it) a good superfatted industrial soap applied to the skin as a "protective substance" before commencing work, will reduce the amount of subsequent cleansing necessary. The lanoline in these soaps protects the skin from the dirt or paint, and the soap element in it readily removes most of the grease and paint whenever the hands are subsequently washed.

(2) After this preliminary cleaning the skin should be washed as in A (1) above, carefully dried, and a small quantity of a simple emollient such as ling. Aq. Rosae or equal parts of olive oil and lanoline rubbed into the skin before leaving the factory.

THE particular protective or barrier substance used in any process is determined by the nature of the work being done, and sepecially by the technical processes involved. A very large number of protective substances and creams are on the market, chiefly as proprietary articles with more or less fancy names. There are three distinct classes of these substances, one of which is designed for skin protection when the worker is exposed to oily and dusty substances, and the second for use with all water solutions. (3) Finally a new series of "barrier substances," the Halden (H.E.B.) substances have been introduced and are now being tried extensively.

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